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ABSTRACT

This informational packet contains the materials necessary to administer the annual Department of Defense Dependent Schools Pacific Region Junior Science and Humanities Symposium (JSHS) at the high school and middle school levels. The symposium program is a calendar year research program which includes one week symposium of students (grade 8-12) who have completed experimental research in any of the sciences, mathematics, the humanities, or computer sciences. Students who attend the one week Symposium present research findings and research proposals; visit importance to the future of mankind. The importance of using a humanistic approach to scientific research is stressed. All grade 8-12 students enrolled in Department of Defense Dependents Schools Pacific Region schools are eligible to participate. The objectives of the Symposium Program are to: promote research and experimentation in the sciences, mathematics, and engineering at the grade 8-12 level; recognize the significance of research in human affairs, and the importance of humane and ethical principles in the application of research results; search out talented youth and their teachers, recognize their accomplishments at symposia and encourage their continued interest and participation in the sciences, mathematics, and engineering; expand the horizons of research-oriented students by exposing them to opportunities in the academic, industrial, and governmental communities, and; increase the number of future adults capable of conducting research and development. The pamphlet is intended to be used by teachers and administrators as they manage the JSHS program within their schools and by students as they conduct their research, write about their research projects, and track the various deadlines which must be met as part of the program. A symposium overview, program description, program objectives, themes, awards, eligibility, fees, project guidelines, abstracts, computer use, judging guidelines, oral presentations, poster sessions, and travel are discussed. The appendices contain project writing guidelines, program application forms, abstract forms, and examples of abstracts of research conducted by other Pacific Region JSHS students. (ZWH)

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ED 404 110

Junior Science *and* Humanities Symposium

January 1994 - July 1995

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Pacific Region
Program
Operations Manual

SE054 190

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PACIFIC REGION JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM OPERATIONS MANUAL

JANUARY 1994 - JULY 1995

Document WP03178.014

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DOCUMENT PURPOSE

The Pacific Region Junior Science and Humanities Symposium (JSHS) Operations Manual contains the information necessary to administer the annual Pacific Region Junior Science and Humanities Symposium at the school level. The guide is revised annually by the Pacific Region Symposium Director, and published in December of each year by the Department of Defense Dependents Schools Pacific Region. Each edition of the guide overlaps the previous edition, covering a period from January of one year to July of the following year. It was prepared for use by high school and middle school administrators, JSHS coordinators, JSHS sponsors, and JSHS mentors as they conduct JSHS programs within schools of the Pacific Region. It should, in addition, be used by students as they write research proposals, conduct research, write reports about research projects, and track the deadlines which must be met as part of the program. The Appendices are especially important to student program participants because they contain project writing guidelines, program application forms, abstract forms, example abstracts of research conducted by other students, and other research project oriented information.

NOTES

ADVISORY BOARD

PURPOSE: The purposes of the advisory board are:

1. To provide advice to the Symposium Regional Director regarding matters related to the functioning of the Symposium.

2. To serve as a Symposium design standing committee.

MEMBERSHIP: The members of the committee are as follows:

1. President of the Pacific Science Teaching Association.

2. Director and Associate Director of the Kanto Plain Student Science Research Program.

3. Symposium Master of Ceremonies.

4. At least one school level administrator.

5. At least one Pacific Region, District Superintendent of Schools

6. Present membership (Beginning of school year 1992-1993 through the end of school year 1994-1995.

a. Sarah Yoshida	Seoul American Elementary School
b. Ann Briley/Vicki Taylor	Kadena Middle School/Edgren High School
c. Alan Fisk-Williams	Edgren High School
d. Fred Jensen	Kinnick High School
e. Norman Heitzman	Kadena Middle School
f. Richard Osner	DSO Japan

TERM OF OFFICE: Two years with the option of two one year extensions.

ANNUAL BOARD MEETING: The annual Advisory Board meeting will normally be held in the spring of the school year sometime after the conclusion of the annual Symposium.

NOTES

PACIFIC REGION JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM PROGRAM OVERVIEW

SYMPOSIUM REGIONAL DIRECTOR: Department of Defense Dependents Schools (DoDDS), Regional Science Coordinator

SYMPOSIUM HOST: DoDDS District Superintendent of Schools, Japan

ACTIVITY DESCRIPTION: The symposium program is a calendar year research program which includes one week symposium of students (grades 8-12) who have completed experimental research in any of the sciences, mathematics, the humanities or computer sciences. Students who attend the one week Symposium present research findings, and research proposals; visit research laboratories and; listen to guest speakers discuss research and its importance to the future of mankind. The importance of using a humanistic approach to scientific research is stressed.

LOCATION: Tsukuba Science City, Japan

TRANSPORTATION ARRANGEMENTS: Arrangements for travel to and from the Symposium are made school administrators of the Department of Defense Dependent Schools Pacific Region, and the District Superintendent of Schools for Japan.

STUDENT PARTICIPANTS: All grades 8-12 students enrolled Department of Defense Dependent Schools Pacific Region Schools are eligible to participate.

NUMBER OF PARTICIPANTS: Approximately 150 students each year.

SYMPOSIUM MEETING DATES: Late March and early April each year.

PROGRAM FUNDING: The Symposium operates under a grant from the Academy of Applied Sciences, Concord, NH and the Army Research Office, Research Triangle Park, Raleigh, NC.

1. ATTENDING FACULTY: All expenses are borne by the Symposium. Transportation to the Symposium meeting and substitute teacher expenses are supported by the Department of Defense Dependents Schools Pacific Region.

2. PARTICIPATING STUDENTS: All Symposium expenses are borne by the Symposium. The only cost to students is a $40.00 non-refundable application fee. Transportation expenses for travel to the Symposium meeting are supported by Department of Defense Dependents Schools Pacific Region.

PARTICIPANT SELECTION PROCESS: To attend the Symposium, a student must: (1) submit an application form postmarked not later than December 15 of the Symposium year; (2) submit an acceptable, completed research paper reporting the results of experimental research postmarked not later than January 15, of the Symposium year, or; (3) submit an acceptable research proposal; (4) submit a computerized copy of the research report or research proposal stored on a computer disk; (5) submit one typed copy of the research paper or proposal must be submitted. Each student's mentor decides whether his or her student has conducted a research project of sufficient quality to warrant having the student researcher attend and participate in the Symposium meeting. Research proposals are evaluated by school personnel and the authors of acceptable proposals subsequently invited to attend the meeting. In years when the number of Symposium applicants exceed the amount of lodging space, a pro rata process based upon school district population is instituted to further select students who be invited to attend. That process is described completely in later paragraphs of this document.

SYMPOSIUM OBJECTIVES: The objectives of the Symposium Program are to; promote research and experimentation in the sciences, mathematics, and engineering at the grades 8-12 level; recognize the significance of research in human affairs, and the importance of humane and ethical principles in the application of research results; search out talented youth and their teachers, recognize their accomplishments at symposia and encourage their continued interest and participation in the sciences, mathematics, and engineering; expand the horizons of research-oriented students by exposing them to opportunities in the academic, industrial, and governmental communities, and; increase the number of future adults capable of conducting research and development.

NOTES

PROGRAM DESCRIPTION

Each year, beginning January first, the Department of Defense Dependents Schools, Pacific Region conducts a Junior Science and Humanities Symposium program that runs for approximately seventeen months. Students are invited to conduct original experimental research in the sciences, mathematics, the humanities, and computer applications that relate to research in those fields. The research period ends January 15 of the next school year. Following conclusion of the research period, students, who have completed research projects and have written research project papers, or have written acceptable research proposals, attend a week long Symposium. A t the Symposium they present the results of their research to other students, visit Japanese science research institutes, participate in Japanese-American cultural events, and participate in other related activities. During the week, three top student researchers are selected from the participants. Later in the spring, the three top students travel to the United States where they attend the National Junior Science and Humanities Symposium. At the National JSHS, the top regional student researcher presents his or her research findings to student researchers from other JSHS regions in the United States and Europe. The student who presents paper at the National Symposium competes with other student presenters for an opportunity to attend the International Youth Science Forum. The forum is held in London, UK during the following summer. The top research student from the Region is awarded a small scholarship by the U. S. Army Research Office and a chance to compete for a scholarship at the National Symposium.

NOTES

GRADE EIGHT FEEDER PROGRAM

The Grade Eight Feeder Program is open to all eighth grade students attending Department of Defense Dependents Schools Pacific Region schools. The program is intended to help students get started in scientific research prior to entering high school. The program functions as follows:

1. Each high, unit, middle, and elementary school may select four eighth grade students each year to attend the Pacific Region Symposium. While not mandatory, we suggest two male and two female students be selected, from each school, to attend the Symposium. Schools with large grade eight research programs may send more than four students. Arrangements, to send additional students, are made with the Symposium Director by school administrators. Such requests are handled on a case by case basis.

Final determiners of which students attend the symposium are: (a) the quality of the experimental research conducted by the potential participants, and; (b) the quality of the research papers written by those students. Selection of students for participation at the annual Tsukuba City, Japan Symposium is accomplished at the respective schools using a process decided upon by school personnel. Whatever selection process is used, eighth grade attendees must have completed an experimental research project, and submitted a paper reporting the results of that research (library research projects are not acceptable).

2. Participating grade eight students must complete an experimental research project, as outlined in this booklet for high school students. All program standards, and requirements listed for high school students apply to grade eight students.

3. Grade eight students either participate in poster sessions, or in a formal eighth grade presentation session.

4. One JSHS sponsor from each elementary, and middle school will attend the Symposium provided the school has at least one grade 8 student who will also attend. In schools having grades 7-12, grade 8 students accompany the JSHS school sponsor (see the section describing sponsors). Schools sending more than four students will send one sponsor for every ten, or increment of ten students (a school sending eleven students, for example, sends two sponsors).

NOTES

RESEARCH PROPOSAL FEEDER PROGRAM

The research proposal feeder program is open to all grade nine students. Each year, two students from each Pacific Region high school may be asked to attend the Symposium. To be eligible for selection under this section of the program, students must do all of the preliminary research work, and subsequently write a completed research proposal acceptable to their mentors. Selections of the research proposal students to attend the Symposium is made at the various high schools by mentors and other science personnel. Research proposals must be in the format provided in the Research Proposal Format, Appendix M to this publication. Students attending the Symposium under the provisions of this paragraph are expected to participate in a poster session. The posters should describe the contents of the proposals. Participating students should submit two copies of their proposals; one copy must be stored on a computer disk in the ASCII format. The second copy should be typed, and double spaced. All application rules, deadlines, writing guidance and so on included in other paragraphs of this booklet apply to students who wish to submit research proposals under this paragraph.

NOTES

JAPAN DISTRICT RESEARCH SEMINAR

Each year the Superintendent of Schools for the Japan District conducts a research seminar program as part of the JSHS program. The program is conducted usually in two locations; Tokyo, and; Misawa Air Base. This program brings teachers, students and scientists together to discuss the research process, brainstorm ideas regarding research topics, identify topics suitable for grades eight through twelve research, discuss the selection of proper statistics for various types of research and more. The program is conducted by personnel from the Japan District, and facilities rentals are supported be the Pacific Region Junior Science and Humanities Symposium.

1. TOKYO SEMINAR: The Tokyo seminar is held twice each school year, usually at the New Sanno Hotel. The program is normally held in the spring after the Pacific Region Symposium and in the fall. Generally, the same students attend each session. The number of students who attend from each Kanto Plain High School as well other high schools in southern Japan is set be the Japan District Superintendent or his representative.

2. MISAWA AIR BASE SEMINAR: This seminar is normally held once each school year, and may be either in the fall or the spring. Again, the number of students who attend is set by Japan school district personnel.

NOTES

PROGRAM OBJECTIVES

The symposium objectives are to:

1. PROMOTE research and experimentation in the sciences, mathematics, and engineering at the grades 8-12 level.

2. RECOGNIZE the significance of research in human affairs, and the importance of humane and ethical principles in the application of research results.

3. SEARCH out talented youth and their teachers, recognize their accomplishments at symposia, and encourage continued interest and participation in the sciences, mathematics, and engineering.

4. EXPAND the horizons of research-oriented students by exposing them to opportunities in the academic, industrial, and governmental communities.

5. INCREASE the number of future adults capable of conducting research and development.

NOTES

PROGRAM THEMES

The following Symposium themes were drafted for school years 87-88 through 03-04. Student researchers need not direct their investigations toward the theme of the year. The theme should be advertised in participating schools by Junior Science and Humanities Symposium coordinators, and school administrators at the beginning of the program year (January 1 of the previous school year), and at the beginning of the school year. Program themes may encourage some students (who might otherwise not conduct a research project) to participate in the program.

	School Year	Theme
1.	87-88	The World Ocean Our Last Frontier
2.	88-89	Space Challenge of the 21st Century
3.	89-90	Science and Humanities - The Eternal Quest
4.	90-91	The Integration of Science and Technology for Mankind
5.	91-92	Biotechnology - Designs for the Future
6.	92-93	Telecommunications - Conversation with the Stars
7.	93-94	The Cosmic Connection
8.	94-95	Project Civilization
9.	95-96	Waste Management- Reduce, Reuse, Recycle
10.	96-97	Population - Exponential Growth in a Finite Environment
11.	97-98	Energy - Exploring the Alternatives
12.	98-99	Energy - Our Fusion Future
13.	99-00	Immunology - Protecting Our Future
14.	00-01	Science - Solving Problems of the 21st Century
15.	01-02	Extinction - Historical Precedence, Future Choice
16.	02-03	Super Science - Computers, Conductors, Colliders
17.	03-04	Atmosphere - The Other Ocean

NOTES

PROGRAM AWARDS

1. STUDENTS:

   a. Formal High School Presenters. Three top student researchers are chosen from those students selected (approximately fourteen each year) to make formal presentations.

      (1) The three top presenters receive a trip to the National Junior Science and Humanities Symposium in the continental United States.

      (2) The first place presenter receives a scholarship to the college of his or her choice. The value is usually $500.00.

      (3) The first place presenter wins the opportunity to present at the National JSHS.

      (4) The first place presenter wins an opportunity to compete for a trip to London.

      (5) The first place presenter wins an opportunity to compete for a national scholarship.

      (6) Other scholarships may be available to participating students. If so, the way in which they are to be awarded will be announced at the beginning of each Symposium.

   b. Grade Eight Formal Presenters. The top grade eight formal presenter is given an award which changes from year-to-year.

   c. Research Proposal Presenters. The top research proposal presenter is given an award which changes from year-to-year.

   d. Poster Presenters. The top poster session presenters are given some sort of recognition. A book of some sort is usually given to the top several individuals.

2. MENTORS: The mentor of the top high school student researcher in the formal presentation session receives a grant, from the Army Research Office, to purchase science equipment for his or her school. The grant is usually $300.00. In cases where the mentor of a student is not a member of a school faculty, the grant shall go to the high school of the winning student, and be spent for equipment in a subject related to the area in which the winning student conducted his or her research.

NOTES

PROGRAM PARTICIPANT ELIGIBILITY

Participation in the Junior Science and Humanities Symposium program is open to all students enrolled in grades 8-12 of Department of Defense Dependents Schools, Pacific Region schools: (1) who are interested in conducting acceptable experimental research projects in the sciences, mathematics, humanities or computer applications related to research in those fields, or; (2) are interested in writing research proposals in those areas, for conduct of research at a later date. To attend the Symposium, program participants must complete a research project, or write a research proposal, as defined in the other sections of this document.

NOTES

APPLICATION FEE

A $40.00 non-refundable application fee is paid by each program participant who wishes to attend the Symposium meeting. The fee must accompany a students application (due December 15) for participation in the Junior Science and Humanities Symposium. The payment must be made by check (cash will not be accepted) payable to the Pacific Region Junior Science and Humanities Symposium.

NOTES

SYMPOSIUM COORDINATORS

A Junior Science and Humanities Symposium Program Coordinator is assigned by the school administrator of each participating school. Coordinators may be paid as part of the schools extra curricular activity program. A decision regarding the payment of coordinators, however, is left to the discretion of individual school administrators. Coordinators, when assigned, may also be mentors, or sponsors (see Symposium Mentors and Sponsors below). Coordinators insure that the school level JSHS programs function in accordance with the guidelines set forth in this publication. Some examples of Coordinator functions are to insure that:

1. Participating students meet the published time requirements listed in this document.

2. Student application forms are submitted.

3. Sponsor application forms are submitted.

4. Student application fees are paid.

5. Parental permission slips are obtained and maintained on file at the school.

6. Students' research papers, and proposals are submitted in time to meet program deadlines.

7. Action, when necessary, is taken to have travel orders cut.

8. When necessary students are helped to identify or locate mentors, working in the community, who are non-Department of Defense Dependents Schools personnel, and willing to guide one or more students through their research. Some examples of professional people who have served as mentors in the past are scientists, medical personnel, and university professors.

Coordinators may be teachers in any academic discipline but, preferably they teach science, mathematics, or computer science.

NOTES

SYMPOSIUM MENTORS

Mentors are people who guide students through their research, or research proposal writing. They help students:

1. Design their research projects.
2. Conduct their research in a manner consistent with the scientific method, and scientific principles.
3. Conduct literature searches.
4. Write research papers.
5. Write research proposals.

Mentors may be teachers, school administrators, scientists, medical personnel, mathematicians, computer specialists, and others working in the school and local community. Mentors may also be program coordinators and sponsors.

NOTES

SYMPOSIUM SPONSORS

Sponsors are people who accompany students from their schools to the Pacific Region Junior Science And Humanities Symposium meeting in Tsukuba City Japan. They also may be program coordinators, and mentors.

NOTES

RESEARCH PROJECT GUIDELINES

1. SCIENTIFIC METHOD: The scientific method is used in all experimental research projects. The method generally includes the following:

a. Identification of an apparent problem through observations of the real world, or as a result of searching the literature.

b. Gathering all pertinent problem related data.

c. Formulating an hypothesis, or research question/s (may be more than one).

d. Performing experiments to test the hypothesis, or gathering data to help answer the research question/s.

e. Interpreting the results of the experiments (usually accomplished through data analysis, and comparison of new data with what is already known about a problem.

f. Drawing one or more conclusions about the hypothesis or research question/s.

2. LIBRARY RESEARCH: Students often conduct library research projects, falsely thinking that such endeavors are a correct application of the scientific method. Generally, this is not the case. While literature searching is part of the experimental research process, it is not, in and of itself, acceptable as a Junior Science and Humanities Symposium project. Proper application of the scientific method is stressed heavily when projects are evaluated to determine which ones (therefore who) will be presented formally at the Symposium. Projects which do not involve experimental research will not be considered prospects for formal presentation.

3. USE OF ANIMALS IN RESEARCH: Animal experiments are subject to a variety of laws, regulations, and guidelines. The federal Animal Welfare Act of 1966 sets standards for handling, housing, transportation, feeding, veterinary care, and use of pain-relieving drugs for dogs, cats, nonhuman primates, rabbits, hamsters, guinea pigs, marine mammals, and other farm animals in nonagricultural research.

The Health Research Extension Act of 1985 sets forth federal policy for humane care and use of laboratory animals.

The combination of the two Acts brings almost all researchers under the oversight of a local review committee known as an Institutional Animal Care and Use Committee. These committees always include a veterinarian experienced in laboratory animal care, and at least one person not affiliated with the institution to represent the interests of the community. Among other things, committees inspect animal research areas, and review proposed experiments to ensure that animals used in research will be used humanely.

A widely accepted guide for animal use in the laboratory is, Guide to the Care and Use of Laboratory Animals, published by the National Research Council, U. S. Department of Health and Human Services, Washington, D. C., 1985.

The use of animals in research projects shall be closely monitored by local school officials. If deemed necessary, a committee as described above shall be set up to monitor research projects using animals. In this regard, the following guidance applies:

a. Unacceptable Projects. Projects leading to the needless killing of animals, or projects in which there is high probability that the research will lead to the death of a research animal are not acceptable as Junior Science and Humanities Symposium research projects.

b. Disapproved of Projects. Projects where there is a chance the research will lead to death of research animals should be evaluated by a board of science teachers and other personnel prior to their approval. The board should evaluate the proposal/s to ensure that all possible precautions to prevent death the of a/the animal/s have been taken. If, after evaluation, the board feels there is still a high probability that the death of a research animal will occur regardless of the precautionary measures the project should not be approved.

c. Acceptable Projects. Projects where there is a slight chance (local determination) that a research animal may die are acceptable but project research methods should be scrutinized closely by mentors prior to project approval. All possible precautions should be taken to prevent the needless loss of research animals.

4. RESEARCH PAPER ORGANIZATION: Guidance for the organization of student research papers is provided in Appendix F, Organization of Student Papers and Abstracts.

5. ADDITIONAL GUIDELINES: Additional guidelines for the conduct of high school research is provided in the publication titled, Conducting Student Research. That document is printed under a separate cover and is supplied to school administrators with this booklet at the beginning of the Symposium program year.

NOTES

RESEARCH PAPER COVER SHEETS

All writers must use the cover sheet shown in Appendix I on their papers. It should be the top page of the document, and precede the abstract. The only place a student's name, and school should appear is on the abstract form. The Cover Sheet is used to help the research paper evaluation team remain as objective as possible while examining the research paper. When a research paper is received:

1. It is given a number.

2. The writer's name, and the school name on the abstract are masked.

3. Both the students name, and the research paper number are recorded prior to evaluation by the paper evaluation team.

NOTES

ABSTRACTS

1. GENERAL: An abstract shall be written for every paper which is submitted, and shall accompany the paper when it is submitted. A form is included in Appendix A, Abstract Forms, for this purpose. That form shall be used. Xerox copies of the form may be made to meet the needs of individual schools.

2. LENGTH: The abstract should be of adequate length to describe the project, but should not exceed 175 words.

3. WRITING: The abstract must be typed, and be single spaced. Hand written abstracts will not be accepted.

4. SUGGESTIONS FOR ABSTRACT WRITING:

   a. Answer Questions. Abstracts should answer the questions; Who; What; Where; When; Why; sometimes, How?

   b. Tense. The past tense should be used throughout the abstract.

   c. Person. Third person should be used to describe completed research.

   d. English Usage. Proper sentence structure, and grammar must be used.

   e. Abbreviations. Do not use abbreviations.

   f. Assumption. Assume readers will have a good technical vocabulary.

   g. Specialized Vocabulary. Try to avoid the use of highly specialized words.

   h. Results and Conclusions. State results or findings, and conclusions of the research in a clear, concise fashion.

5. EXAMPLE ABSTRACTS: Examples of abstracts are included in Appendix G, Example Abstracts.

6. ADDITIONAL INFORMATION: Additional information about abstract writing is contained in the publication titled, Conducting Student Research. That document is printed under a separate cover.

USE OF COMPUTERS

Wordprocessors must be used when research papers and proposals are typed. Apple, Macintosch, IBM and IBM compatible computers are acceptable. Whatever computer is used, regardless of the program, the document file should be stored in the ASCII format. Researchers should print the name of the computer, and the program they used on the computer disk label before the disk is submitted. Figures and Tables, whose form would be destroyed by storing them in the ASCII format, may be stored on the disk in the format of the program used when they were generated. In this case, the name of the program used should accompany the submission of the computer disk.

NOTES

TYPING AND PRINTING RESEARCH PAPERS AND PROPOSALS

1. PAPERS:

   a. Body Of The Paper. To be acceptable, papers must be printed (also see computer instructions above), double spaced (except for abstracts). Papers that are not printed double spaced are not be acceptable and will be returned to their authors' for correction.

   b. Abstract: When printing a paper's abstract, the form provided in Appendix A is used; also see the "Abstract" section above and Appendix G. Abstracts are printed single spaced. Abstracts not printed on the form provided, not printed single spaced or not adhering the space allocation provided by the form will not be accepted. They will be returned to their authors' for correction.

2. PROPOSALS: To be acceptable, research proposals must be printed double spaced. Proposals that are not printed double spaced are not be acceptable and will be returned to their authors' for correction.

NOTES

RESEARCH PAPER AND PROPOSAL SUBMISSIONS - WHERE AND WHEN TO SEND THEM

1. TIME - WHEN TO SEND THEM: Research papers and proposals should be mailed so they arrive at the location listed below on or before the deadline date listed below in the Symposium Time-line. Papers that arrive in envelopes later than the deadline will not be considered for formal presentation. The authors of papers which arrive after the deadline will present the results of their research in a poster session.

2. COPIES OF RESEARCH PAPERS - WHERE TO SENT THEM: Two copies of the paper shall be submitted as follows:

a. Send one printed, double spaced copy to; This copy is used for evaluation by the U. S. Army research evaluation team as they decide which papers will be presented formally at the Symposium. Mis-mailing this copy may result in the paper not being considered for formal presentation.

DISTRICT SUPERINTENDENT OF SCHOOLS, JAPAN
APO SAN FRANCISCO, CA 96328-0005
ATTN: JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM
AUTOVON 225-3940/3941/3947

b. Send one computer copy (data disk) to;

SCIENCE COORDINATOR
DOD DEPENDENTS SCHOOLS PACIFIC
EDUCATION DIVISION
PSC 556 BOX 796
FPO AP 96372-0796

3. COPIES OF RESEARCH PROPOSALS - WHERE TO SEND THEM:

a. Send one printed, double spaced copy to;

SCIENCE COORDINATOR
DOD DEPENDENTS SCHOOLS PACIFIC
EDUCATION DIVISION
PSC 556 BOX 796
FPO AP 96372-0796

b. Send one computer copy (data disk) to;

SCIENCE COORDINATOR
DOD DEPENDENTS SCHOOLS PACIFIC
EDUCATION DIVISION
PSC 556 BOX 796
FPO AP 96372-0796

JUDGING GUIDELINES

1. RESEARCH PROJECTS AND PAPERS.

a. First Evaluation. The first evaluation of research papers is accomplished by the students' mentors. This is an evaluation of project, and paper acceptability.

b. Second Evaluation. All printed research papers submitted to the District Superintendent of Schools for the Japan district where they are scanned for format.

c. Third Evaluation. All research papers found to be in the proper format, and include all of the sections described in the format section of this publication are evaluated by a team of scientists, and other research oriented individuals. Themevaluating research personnel examine the papers to determine:

(1) The quality of the investigator's research design.

(2) The originality of the research topic.

(3) The level of scientific understanding displayed in the paper.

(4) The quality of the paper itself.

As a result of the third evaluation, the papers of approximately fourteen grades nine through twelveparticipants, and eleven eighth grade participants are selected for formal presentation at the Symposium. Appendix B contains a copy of the Research Paper Evaluation form used for this process. All students not selected to present their papers formally present the results of their research in a poster session.

c. Fourth Evaluation (Symposium Presentations).

(1) High School (grades 9-12). High school students chosen, to present their papers formally at the Symposium, are evaluated a fourth time. This time, the formal, oral presentations are judged to determine:

(a) The quality of the research design.

(b) The originality of the research topic.

(c) The level of scientific understanding about the research project possessed by the presenter.

(d) The quality of the presentation.

Appendix C contains a copy of the Oral Presentation Evaluation form used for this process. As a result of the evaluation process, three high school (grades 9-12) participants are selected to attend the National Junior Science and Humanities Symposium in the U.S. The composite scores of evaluations three and four are used to identify the three top student researchers. Through this process, one of the high school students is selected as the number one researcher. The top student researcher presents his or her paper at the National Symposium.

(1) Grade Eight. Grade eight students chosen to formally present the results of their research to Symposium participants are evaluated a third time. This time, oral presentations are made and judged to determine:

(a) The quality of the research design.

(b) The originality of the research topic.

(c) The level of scientific understanding about the research project possessed by the presenter.

(d) The quality of the presentation.

Grade eight students do not present their papers in the same sessions with high school students. In their session, only grade eight students make presentations. The form used to evaluate the oral presentations is found in Appendix C. The student presenters are rank ordered based upon the composite scores of evaluations three and four.

2. RESEARCH PROPOSALS.

a. First Evaluation. The first evaluation of research proposals is accomplished by the mentors of student proposal writers. This is the first evaluation of proposal acceptability.

b. Second Evaluation. All research proposals submitted to the Department of Defense Dependents Schools Pacific Region Office where they are evaluated by a team to determine:

(1) The quality of the investigator's research design.

(2) The originality of the research topic.

(3) The level of scientific understanding of the topic displayed in the proposal.

(4) The quality of the proposal itself.

As a result of the second evaluation, the proposals of two ninth grade students from each high school are invited to attend the Symposium. All students selected to attend the Symposium under the research proposal portion of the program present their proposals in one of the poster sessions. A copy of the Research Proposal Evaluation Form is included in Appendix J.

ASSIGNMENT OF JUDGES

1. FORMAL PRESENTATIONS: Judges for formal presentations are drawn from a variety of sources on a volunteer basis. Those sources include:

a. Stateside Universities.

b. U. S. Army Research Office, Yokota Air Base, Japan.

c. U. S. Naval Research Office, Tokyo, Japan.

d. U. S. Embassy, Tokyo, Japan.

2. POSTER SESSIONS: Sponsors accompanying participants to the Symposium serve as judges of poster session research projects. Accordingly, judges have assigned to them, in a random fashion, enough students during each poster session so that every research project is evaluated by at least three judges. Actual assignment is accomplished using the following scheme using a computer database (see Figure 1):

a. Each student is assigned a linear number when the students paper is received on January 15th. The numbers start at 1 and proceed until all participants have been assigned a number.

b. Each sponsor is assigned a linear number in the same sequence as the students, numbers.

NO.	NAME	,SCHOOL	STUD/SPON.	POST.SE.NO.	JUDGES/JUDGED
001	JONES, J.	KINNICK	STUDENT	1	5,8,9
002	BUD, M.	ZAMA	STUDENT	2	8,9,5
003	ROW, S.	LESTER	STUDENT	3	9,5,8
004	WEISER, B.	EDGREN	STUDENT	4	5,8,9
005	BOSWAI, A.	PUSAN	SPONSOR	NA	1,2,3,4,6,7,10,11,12,13,14,15,16
006	SCHLITZ, U.	TAEGU	STUDENT	5	8,9,5
007	COAST, I.	OSAN	STUDENT	6	9,5,8
008	GUARD, B.	YOKOTA	SPONSOR	NA	1,2,3,4,6,7,10,11,12,13,14,15,16
009	ARMY, T	SEOUL	SPONSOR	NA	1,2,3,4,6,7,10,11,12,13,14,15,16
010	BLUE, R	MC PERRY	STUDENT	1	5,8,9
011	BULL, F	KING	STUDENT	2	8,9,5
012	DOG, E.	KADENA MS	STUDENT	3	9,5,8
013	NAVY, G	KADENA HS	STUDENT	4	5,8,9
014	WIRE, P	KUBASAKI	STUDENT	5	8,9,5
015	MAN, Y.	OSAN	STUDENT	6	9,5,8
016	SHULTZ,	ZAMA	STUDENT	1	5,8,9

Figure 1. Example of the Poster Session Judging Assignments.

c. Each poster session student is assigned to a poster session. Poster sessions are numbered 1-6.

d. Linear numbers of students to be judged are listed after the names of the respective judges.

e. Linear numbers of the judges are listed after the listed after the participants they are to judge.

NOTES

ORAL PRESENTATION SEQUENCE

Formal presentations sessions are managed by the Symposium Master of Ceremonies, and timed by the session timer. The following sequence is used for each presentation.

1. Order in which students make presentations is provided to the Master of Ceremonies by the Symposium Director.

2. The Master of Ceremonies provides school sponsors with student sequence of presentation information.

3. The Master of Ceremonies explains the timing procedures and acceptable questioning to the audience (outlined in the following section of this publication).

4. The Master of Ceremonies introduces, to the audience, the sponsor of the student who will present.

5. The sponsor of the presenting student introduces the presenter to the audience. Usually, the sponsor cites the name of the student's project as part of the introduction.

6. The session timer provides the presenter with timing information as described the following section, "ORAL PRESENTATIONS."

7. Prior to beginning the question and answer session, the Master of Ceremonies reminds the audience about the acceptable types of questions that can be asked of the presenter, and the amount of time allowed for questions and answers.

8. The Master of Ceremonies asks the presenter to repeat each question to the audience before beginning the answer.

9. The Master of Ceremonies introduces the next presenter.

NOTES

ORAL PRESENTATION GUIDANCE

1. PREPARING FOR ORAL PRESENTATIONS: Students often become nervous when they must face an audience. As a result of nervousness, their presentations, which might have otherwise been well done, turn out poorly. Practice presentations, made to a group of student friends, while the presentation is video taped, may help student presenters overcome some of their fears, nervousness and the like. Once students have had their presentations video taped, they should:

   a. View the video tape.

   b. Ask fellow students to view the video tape, and suggest ways to improve the presentation.

   c. Have mentors, sponsors, coordinators, and teachers view the video tape and make suggestions for improvement.

   For the best possible results, this process should be repeated several times.

2. USE OF VISUALS: Slides and overhead projections may be used during oral presentations.

   a. Visuals must be easily readable at the back of a large lecture hall. Students often fail to look at this quality before they make their presentations, only to learn the printing could not be read by most of their audience. As a rule, regular size typing used on overhead projections, even when magnified by the projection equipment, is too small to be read by distant viewers. Visual aids which cannot be read by everyone in an audience, detract from a presentation.

   b. Visuals should numbered so that if one needs to be shown again it can be easily and quickly located.

   c. Visuals should be simple. Students often try to pack too much information into a visual. It is better to use two visuals than one when large quantity of visual information must be presented to an audience.

3. TIME ALLOWED FOR PRESENTATIONS:

   a. Grades 9-12. Grades 9-12 formal presenters are allowed 15 minutes to make their presentations. A speaker must stop end of 15 minutes even though the presentation has not been completed. Presenters are given a three minute warning by the program moderator following 12 minutes of presentation. At the conclusion of a presentation, the audience is allowed a 10 minute question and answer period. During the question and answer period, the judges and the audience are free to ask questions about any aspect of the research project they wish. Questions not related to the research are not acceptable

   b. Grade 8. Grade 8 formal presenters are allowed 12 minutes to make their presentations. Speakers must stop at the end of 12 minutes even though the presentation is not complete. Presenters are given a three minute warning by the program moderator following 9 minutes of presentation. At the conclusion of a presentation, the audience is allowed 5 minutes to ask questions about the research project. During the question and answer period, the audience is free to ask questions about the research project. Questions not related to the research are not acceptable.

4. FIELDING QUESTIONS: Presenters are often judged by the way the field questions asked by judges and the audience. Since auditoriums in which formal presentations are made often are quite large, it is good form for the presenter to repeat the question to the audience after it is asked. Presenters should begin their answer by saying, "The question was......"

NOTES

POSTER SESSIONS

1. GENERAL: Several poster sessions are held during the Symposium.

2. POSTER SESSION PARTICIPANTS:

   a. All students not scheduled to make formal presentations are expected to present their research in a poster session.

   b. All students attending the symposium as a selected research proposal writers are expected to make poster presentations.

3. POSTERS:

   a. Size; Posters should be than one meter by one meter.

   b. Composition; Posters should summarize a research project, showing, in the most vivid way possible, the important aspects of the project. They should include:

      (1) Research Project Title.

      (2) Researcher's Name.

      (3) Methods. Research methods used during the project should be included.

      (4) Results. Results should be presented using photographs, Figures, Tables, and a minimum of text. Research proposal writers should include their expected results.

      (5) Conclusions. The conclusion(s), being perhaps the most important part of the research, should be related to the project findings. The amount of verbiage used on the poster should be limited and written in clear, correct, standard English.

   c. Color: Intelligent use of color can make the difference between a monotonous display and one that says, "for something interesting, come over here."

   d. Crowding: Constructing posters which appear crowded with too much data should avoided. To help avoid crowding, students should consider giving interested individuals a copy of the research project abstract rather than trying to force all possible information about a project on one poster!

   e. Evaluation; Posters are evaluated by sponsors. Judges use the Poster Session Evaluation Form in Appendix D in the judging process. As a result of this process, the top twelve projects are selected.

4. POSTER SESSION LENGTH: Poster sessions are one hour long. Each student presenting a poster is assigned to one of the sessions and has the other sessions free to visit with other poster session presenters. During the session to which a student is assigned, he or she is expected to

make mini-presentations to anyone interested in learning about the research outlined by the poster.

NOTES

SYMPOSIUM TIME-LINE

1. January 1 Students begin research projects.
2. December 15 Students submit:
    a. Applications for participation in the Symposium to the Regional Symposium Director.
    b. The $40.00 non-refundable application fee to the Pacific Region Symposium Director.
    c. One copy of "Parental Permission for School Activity" DSP Form 105 or equivalent to the school JSHS coordinator.
3. January 15 Students submit:
    a. Computerized copy of their abstract and research paper, or a computerized copy and a paper copy of their proposal to the Pacific Region Symposium Director.
    b. Printed copy of their abstract and research paper to District Superintendent of Schools, Japan.
4. March/April Regional JSHS at Tsukuba City, Japan.
5. April/May National JSHS, U.S.
6. July International Youth Science Forum, London, United Kingdom

NOTE: The time line covers a one and a half year period.

NOTES

SYMPOSIUM STUDENTS' AND SPONSORS' APPLICATION FORMS

Copies of sponsor and student application forms are included in Appendix E. Xerox copies of the form should be made to meet the needs of individual schools. All attending students and sponsors must submit application forms.

NOTES

PARENTAL PERMISSION FORM

Parental permission, to attend the Symposium, must be obtained before a student can attend the Symposium. Permission is obtained by having the student participants' parents complete, "Parental Permission for School Activity," DSP Form 105 or equivalent. Completed forms for attending students shall be retained by the respective schools.

NOTES

ACCEPTANCE OF STUDENT PARTICIPANTS

1. RESEARCH PROJECT PARTICIPANTS: Acceptance of students to attend the Symposium is based upon the following criteria;

a. Successful completion of a high quality research project an associated report.

b. Submission of the research paper at or before the deadline listed in the Symposium timeline section of this publication.

c. Submission of an application to attend the Symposium and associated payment of the application fee.

Determination of whether or not a research project, and report meet acceptable standards is based upon the guidance provided in this document. The evaluation is made by the student's mentor or through some other process established by individual schools. Once a research project and the written report have been deemed acceptable, that student may attend the Symposium.

2. RESEARCH PROPOSAL PARTICIPANTS: Ninth grade research proposal students are accepted for attendance at the Symposium based upon the following criteria;

a. Successful completion of a research proposal.

b. Submission of the research proposal at or before the deadline listed in the Symposium timeline section of this publication.

c. Submission of an application to attend the Symposium and associated payment of the application fee.

The quality of a research proposal is determined by a student's mentor. Once a research proposal has been deemed acceptable, that student may attend the Symposium.

3. OBSERVERS: From time-to-time student observers may be invited to attend the Symposium.

NOTES

TRAVEL ORDERS

1. SPONSORS: Travel orders for sponsors are issued by local school administrators or the district superintendents of schools office (depends upon district policy). Sponsors' temporary duty orders shall include the following statement in block 16 of DD Form 1610 (Request And Authorization For TDY Travel of DOD Personnel), "Limited per diem of $3.50 per day is authorized from 1500 hours, (insert a date here) Sunday through 1200 hours, (insert a date here) Friday. Full per diem is authorized for the remainder of the temporary duty period." Use of commercial foreign flag air carrier, may be authorized by the respective district superintendents of schools in emergency situations. Otherwise Air Mobility Command (AMC) air transportation shall be used. Where necessary, rail and bus transportation may be used (see Appendix K). The Far East Tournaments TDY Funding Document should be used to obtain the fund citations Symposium travel and per diem.

2. STUDENTS: Travel orders similar to those used for student travel to athletic events shall be issued to student Symposium participants.

NOTES

TRAVEL DIRECTIONS

1. YOKOTA AIR BASE ARRIVAL TIMES: Yokota Air Base Air Mobility Command (AMC) terminal tentative arrival times, flight numbers, and arrival dates for personnel traveling via AMC aircraft to attend JSHS must be sent to District Superintendent of Schools (DSO), Japan. Arrival messages may be sent via telephone, FAX or CC Mail. The relevant numbers and addresses are:

   a. Telephone - DSN 225-3940/3941/3947; commercial (81 country code) 0425-52-2511 plus the last five digits of the DSN telephone number.

   b. FAX - DSN 225-3952.

   c. CC Mail - Japan, SUPT DSO at JAPA-DSO.

2. MEETING ARRIVING JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM ATTENDEES: A Department of Defense Dependents Schools, Japan District representative will attempt to meet all incoming AMC flights if the flight information requested in paragraph 1 of this section has been provided. If a flight is not met, the sponsor should call the Japan school district representative by telephone at (commercial) 0425-45-4894 or (DSN) 225-3940/3941/3947.

3. HANADA AIRPORT TOKYO ARRIVALS: Arrival information for personnel flying to Hanada Airport should be forwarded to DSO Japan as described in paragraph 1 of this section. Instructions for travel to either Yokota Air Base or Tsukuba City will be provided upon request.

4. NARITA AIRPORT TOKYO ARRIVALS: Arrival information for personnel flying to Narita Airport should be forwarded to DSO Japan as described in paragraph 1 of this section. Transportation by bus to Yokota Air Base is available at Narita Airport. Arriving personnel needing to travel to Yokota Air Base may obtain bus travel information form the military representative at Narita Airport or the information counter outside of the customs area. Travel from Narita Airport to Tsukuba City by train is also available.

5. YOKOTA AIR BASE DEPARTURE: Buses will depart for Tsukuba City from the Yokota Officer's Club parking lot at 1100 Sunday.

NOTES

MEALS DURING THE SYMPOSIUM

1. STUDENTS' RESPONSIBILITY: Students are responsible for all food costs incurred following their departure from home, and prior to the evening meal, Sunday. Students are also responsible for purchasing their own meals, following the noon meal Friday, until they arrive home.

2. SYMPOSIUM MEALS: Food is provided free to all participants during the Symposium period.

NOTES

LODGING AT THE SYMPOSIUM

1. EARLY ARRIVAL AT YOKOTA AIR BASE: Symposium attendees who arrive at Yokota Air Base prior to the Sunday departure for Tsukuba City will be lodged at some Yokota Air Base location. It may be necessary at times to house travelers at one of the Yokota Air Base schools. Unless otherwise notified, travelers should bring:

   a. Sleeping bags.

   b. Towels.

   c. Shower shoes.

   d. Bathrobe.

2. LATE DEPARTURE FROM YOKOTA AIR BASE: Travelers departing Yokota Air Base on Saturday or Sunday after the Symposium will be provided lodging at one of the Yokota Air Base School or some other location.

3. YOKOTA AIR BASE BACHELOR OFFICERS' QUARTERS: Sponsors and students who arrive early or depart late, may by billeted at the Yokota Air Base BOQ when space is available. BOQ reservations at the Yokota Air Base for the period before departure for Tsukuba City, and following return from Tsukuba City are made by a DSO Japan representative. It is important to notify DSO Japan of arrival times so that adequate BOQ space may be arranged. For reference, the Yokota Air Base Billeting Office may be contacted by telephone at DSN 225-7326. The cost of BOQ lodging must be paid by the BOQ users when they check in, and is normally $8.00 per night. BOQ expenses for students will not be paid by the Symposium or from Department of Defense schools funds.

4. LODGING AT TSUKUBA CITY: Generally, all Symposium participants are housed at the Tsukuba Training Center. Housing costs are paid from Symposium funds.

NOTES

TRAVEL CLAIMS

All sponsors must file a travel claim, DD Form 1351, within five working days following the completion of travel. A copy of the form is provided at the Symposium. The forms are filed in accordance with procedures used at the base where a sponsor's school is located.

NOTES

TENTATIVE SYMPOSIUM SCHEDULE

SUNDAY

1100	Depart Yokota Air Base Officers Club
1500-1600	Check In At Tsukuba Training Center
1700	Dinner
1900	Sponsors' Meeting Location TBA
2300	Lights out

MONDAY

0700	Breakfast
0830-0930	Poster Sessions 1 & 2
0945-1045	Poster Sessions 3 & 4
1100-1200	Poster Sessions 5 & 6
1200	Lunch
1300	Field Trips A & B
1800-2000	Stand-up Reception at University Hall
2100	Sponsors' Meeting Location TBA
2300	Lights Out

TUESDAY

0700	Breakfast
0830	Grades 9-12 Formal Presentation Session 1
1200	Lunch
1300	Field Trips C & D
1630	Shopping Trip in Tsukuba City
1745	Sponsors' Meeting Location TBA
1200	Lunch
1300	Depart for Field Trip
1700	Sponsors' Meeting Location TBA
1800	Dinner
1915-2100	Grade 8 Research Seminar 1
2300	Lights Out

WEDNESDAY

0700	Breakfast
0800-1000	Grades 9-12 Formal Presentation Session 2
1000-1045	Keynote Address
1045-1200	Grades 9-12 Formal Presentation Session Continued
1200	Lunch
1300	Field Trips E & F
1700	Sponsors' Meeting Location TBA
1800	Dinner
1915-2100	Grade 8 Research Seminar 2
2300	Lights Out

THURSDAY)

0700	Breakfast
0830	Grade 8 Formal Presentation Session 1

0930-1200	Field Trip G
1200	Lunch
1300	Grade 8 Formal Presentation Session 2
1300-1500	Field Trip H
1600-2100	Cultural Exchange Program
2300	Lights Out

FRIDAY

0700	Breakfast
0900	Awards Ceremony
1100	Sponsors Meeting Location TBA
1130	Checkout of the Training Center & Lunch
1230	Travel to Yokota Air Base

NOTES

FIELD TRIP ASSIGNMENTS AND MANAGEMENT

1. ASSIGNMENTS: All field assignments are made on a random basis as follows.

    a. All field trips are lettered. The Tentative Schedule on the previous page shows eight trips lettered successively from "A" through "H."

    b. A computer database is used to track the assignments.

2. MANAGEMENT:

    a. Tickets. Colored tickets are printed for each field trip. The ticket for each field trip is different from that of the other field trips. Tickets are provided to participants at the time they check in at the Symposium lodging facility.

    b. Transportation. Buses are marked with the letter of the field trip the bus is serving.

    c. Trip Monitors. One sponsor is assigned to each bus as a field trip monitor. Monitors collect field trip tickets. In order to get on a field trip bus, a participant must present the correct field trip ticket to the monitor.

NOTES

RECEPTION EVENTS SEQUENCE

The JSHS reception is normally held is normally held the first evening of the Symposium. Here students and sponsors have an opportunity to socialize, meet one another and so on in a non-formal setting. The reception events are conducted by the program master-of ceremonies. Those events are listed below in sequential order.

	TIME	EVENT	SPEAKER
1.	1800	Welcome to the Symposium	Master-of-Ceremonies
2.	1810	Introduction of Participants by School	Individual School Sponsors
3.	1830	Introduction of Symposium Guests, Judges, Others	Master-of-Ceremonies
4.	1840	Symposium Comments & Welcome	District Superintendent of Schools for Japan
5.	1845	Housekeeping Items	District Superintendent of Schools Representative
6.	1850	Food and Conversation	Everyone
7.	2000	Announcement of Bus Departure/End of Reception	Master-of-Ceremonies

---

NOTES

THINGS YOU SHOULD KNOW ABOUT TSUKUBA CITY AND THE TRAINING CENTER

1. MONEY: It is difficult, in the Tsukuba City area, to convert dollars into yen! Symposium participants should plan accordingly, bringing as much yen as they think they will need.

2. TOWELS: The Tsukuba City Training Center, where Symposium participants are lodged during their stay, does not provide towels with the rooms. Participants must bring their own towels.

3. DRESS:

a. Students;

(1) Dress-up for the banquet.

(2) Dress-up during formal presentations.

(3) Dress-up during poster presentations.

(4) Bring casual and cool weather clothing. Its not too late for snow in this part of Japan.

b. Sponsors;

(1) Be prepared to introduce your students to the audience if they are making formal presentations. Also, sponsors should be prepared to introduce their students to other Symposium participants at the Symposium banquet.

(2) Bring casual, and cool weather clothing.

4. ROOMS: Sponsors, and students each have single rooms. Sponsors' rooms are in the same areas on the same floors as the rooms of their students.

5. FOOD: Food at the Training center is Japanese style. There are many local establishments where other types of food may be purchased. Such purchases, however, are at an individual's own expense.

6. TRAINING CENTER BATHING STYLE: The training center is set up in traditional Japanese style. There is a community bath and showers for men and a separate community bath and showers for women. Hot water is usually on only during specified hours. Those hours are announced at the beginning of the Symposium, and are ample enough to accommodate everyone.

NOTES

AWARDS CEREMONY SEQUENCE

The Awards Ceremony is conducted by the Master of Ceremonies according to the following sequence.

1. POSTER SESSIONS: Poster session awards are the first awards presented during the ceremony.

   a. The Master of Ceremonies is provided the name and school of a student who will receive an award by the Symposium score keeper.

   b. The sponsor is called to the podium and given the name of the student to be given an award.

   c. The sponsor calls the student to receive an award to the podium.

   d. The student is presented the award by the Master of Ceremonies while the Symposium photographer takes pictures.

   e. The next sponsor is called until all porter session awards have been made.

   f. Poster session students and their sponsors are called to the stage, school by school for school group photographic sessions.

2. GRADE EIGHT FORMAL PRESENTATIONS: In order, awards to the grade eight presenters are made next.

   a. The same sequence, as was used for the poster sessions, is used here. At least three students will be recognized as first, second and third place presenters in reverse order.

   b. Following the presentations, all grade eight formal presenters and their sponsors participate in a photo session.

3. GRADES NINE THROUGH TWELVE FORMAL PRESENTATIONS: In order, awards to the grade nine through twelve presenters are made next.

   a. The same sequence, as was used for the poster sessions, is used here. Three students will be recognized as first, second and third place presenters in reverse order.

   b. Following recognition of the first place student, scholarship certificates are presented by the Symposium Director and other donators of Scholarships.

   c. Following the presentations, all grades nine through twelve formal presenters and their sponsors participate in a photo session.

4. CLOSING REMARKS:

   a. District Superintendent of Schools for Japan.

   b. Symposium Director.

NOTES

APPENDIX A

ABSTRACT FORMS

DIRECTIONS: Symposium participants submitting papers they wish considered for formal presentation must use this form for their abstract.

NOTES

Specify the scientific field of research of your abstract, designating both the major scientific discipline and the sub-discipline.

NAME:
HOME ADDRESS:
CITY, STATE, ZIP:
SCHOOL:
SPONSOR/TEACHER:
ABSTRACT TITLE:

ABSTRACT FORM FOR NATIONAL JSHS STUDENT PARTICIPANTS

Abstracts prepared by the student finalists attending the National JSHS will be published and distributed to the symposium. The submitted abstracts are not edited; therefore, students should carefully review and edit their abstract. Make sure the abstract is clearly and concisely written, and correct mistakes in punctuation, grammar, spelling, and typing.

A good abstract is written to summarize the research paper. The abstract should accurately convey the essential nature of the research conducted and the most significant conclusions reached. For the National JSHS, a further purpose of the abstract is to attract the interest and curiosity of the non-specialist reader and thus encourage exchange, discussion and elaboration between various authors and between authors and readers.

INSTRUCTIONS: *Abstracts must be in typewritten form, standard 12 point style, and must be single-spaced. The Courier 12 type style is recommended. Use the spacing and capitalization style shown by examples on the reverse side of this sheet. If any diagrams are used, draw in black ink. The abstract should be adequate in length but not exceed 175 words.*

ABSTRACTS MUST BE SUBMITTED ON THIS FORM. DO NOT SUBMIT A PHOTOCOPY. TYPE WITHIN THE ABOVE 4-CORNER, BLUE-LINE FRAME.

BEST COPY AVAILABLE

Example of 100-word Abstract

NAME: Glick, Gary
HOME ADDRESS: 20 Surrey Road, Somerset, New Jersey 08873
SCHOOL: Franklin Township High School
SPONSOR/TEACHER:
TITLE: Characterization of Medieval Window Glass by Neutron Activation Analysis

The concentrations of 15 component oxides in medieval stained glass were determined by instrumental thermal neutron activation analyses. Three groups of glass were studied: 52 specimens from a set of 13th century French grisaille panels from a demolished royal chateau at Rouen; 10 samples from a grisaille panel in the collection of the Princeton University Museum of Art; and a set of 32 random fragments of varied provenance.

Significantly differing compositions were found. However, specimens from within individual and related groups of panels are compositionally similar even for different colors of glass, indicating a common origin for the related pieces.

Example of 175-word Abstract

NAME: Kornfeld, Stephen Kerry
HOME ADDRESS: 50 Villa Coublay, Frontenac, Missouri 63131
SCHOOL: Horton Watkins High School
SPONSOR/TEACHER: Charles Smith
TITLE: A Determination of the Oligosaccharide Binding Specificity of Lectins from Pisum sativum and Lens culinaris

Lectins agglutinate red blood cells by binding to cell surface glycoproteins. The lectins recognize and bind to the sugar portions of the glycoproteins. Because different lectins are specific for different sugar sequences, lectins are useful tools for fractionating and isolating glycoproteins. This study was to determine the precise oligosaccharide binding of the pea (Pisum sativum) and the lentil (Lens culinaris) lectins. The lectins were covalently bound to an insoluble support, Sepharose, which was suitable for affinity chromatography. A variety of radioactively labeled glycopeptides with different oligosaccharide structures were tested for binding to the lectin affinity columns. The conclusion is that affinity binding to the pea and lentil lectins requires at least two α-linked mannose residues that are not substituted at positions 3, 4, or 6 as well as the fucose residue. While the mannose and fucose residues are essential for high affinity binding, neither sugar residue by itself is sufficient for binding. With this information, these two lectins can become useful tools for fractionating the glycoproteins of animal cells.

APPENDIX B

RESEARCH PAPER EVALUATION FORM

DIRECTIONS: Assignment of points within categories is left to the discretion of individual evaluators.

NOTES

PACIFIC REGION JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM
RESEARCH PAPER EVALUATION FORM

Title of the Paper (from the paper cover sheet):________________________________

____

Paper Number:____

Points		CRITERIA
________	____40____	I. Quality of the Research Design
	________	a. Statement and Delimitation of the Problem
	________	b. Identification of Variables
	________	c. Recognition of Measurement Limitations
	________	d. Adequacy of Data (amount)
	________	e. Appropriateness of Statistical Analysis
________	____20____	II. Originality of Topic or Approach
	________	a. Suitable Topic for High School Research
	________	b. Personal Work Vs. Professional Help
	________	c. Degree of Originality
________	____25____	III. Scientific Understanding Displayed
	________	a. Emphasis On Significant Vs. Trivial Details
	________	b. Degree of Objectivity
	________	c. Scientific Vs. Value Judgments
	________	d. Recognition of Limitations of the Study
	________	e. Conclusions Based On Evidence
________	____15____	IV. Quality of the Paper Itself
	________	a. Title
	________	b. Abstract
	________	c. Introduction Section
	________	d. Methods or Procedures Section
	________	e. Data or Findings Section
	________	f. Discussion Section
	________	g. Conclusions Section
	________	h. Limitations of the Study Section
	________	i. Suggestions for Further Research Section
	________	j. Literature Cited or References Section
________	Total Points	

Evaluator Comments:____

____

____

____

____

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____

APPENDIX C

ORAL PRESENTATION EVALUATION FORM

DIRECTIONS: Assignment of points within categories is left to the discretion of individual evaluators.

NOTES

PACIFIC REGION JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM
ORAL PRESENTATION EVALUATION FORM

Title of the Paper (from the paper cover sheet): ____________________

____

Name of the Presenter ____________________

Points		CRITERIA
________	25	I. Quality of the Research Design
	________	a. Statement and Delimitation of the Problem
	________	b. Identification of Variables
	________	c. Recognition of Measurement Limitations
	________	d. Adequacy of Data (amount)
	________	e. Appropriateness of Statistical Analysis
________	10	II. Originality of Topic or Approach
	________	a. Suitable Topic for High School Research
	________	b. Personal Work Vs. Professional Help
	________	c. Degree of Originality
________	35	III. Scientific Understanding Displayed
	________	a. Emphasis On Significant Vs. Trivial Details
	________	b. Degree of Objectivity
	________	c. Scientific Vs. Value Judgments
	________	d. Recognition of Limitations of the Study
	________	e. Conclusions Based On Evidence
________	30	IV. Quality of the Presentation
	________	a. Title
	________	b. Introduction
	________	c. Methods or Procedures
	________	d. Data or Findings Display and Description
	________	e. Discussion
	________	f. Conclusions
	________	g. Limitations of the Study
	________	h. Suggestions for Further Research
	________	i. References Made to Other Research
	________	j. General Clarity of Expression
________	Total Points	

Evaluator Comments: ____________________

____

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APPENDIX D

POSTER SESSION EVALUATION FORM

DIRECTIONS: Assignment of points within categories is left to the discretion of individual evaluators.

NOTES

PACIFIC REGION JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM
POSTER SESSION EVALUATION FORM

Name of Student:______________________________
Project Number:______________________________
Research Project Title:______________________________
____

KEY

0 = Missing 2 = Satisfactory
1 = Unsatisfactory 3= Excellent

EXPERIMENT

- evidence of originality	0 1 2 3	
- evidence of independently developed procedures	0 1 2 3	
- isolation of variables	0 1 2 3	
- control of variables	0 1 2 3	
- use of appropriate statistics	0 1 2 3	
- sufficient data collected	0 1 2 3	
- data supported conclusions	0 1 2 3	
- statement of limitations provided	0 1 2 3	
	________	SUBTOTAL 1

POSTER

- problem/hypothesis clearly stated	0 1 2 3	
- displayed data easily interpreted	0 1 2 3	
- pictures/drawings/outline of procedure	0 1 2 3	
- conclusion/s correspond to problem/hypothesis	0 1 2 3	
- technical aspects met: size 1M x 1M/color/spacing	0 1 2 3	
- relevant non-repetitious material displayed	0 1 2 3	
	________	SUBTOTAL 2

PRESENTATION

- abstract provided	0 1 2 3	
- clear summary of procedures	0 1 2 3	
- referred to relevant literature	0 1 2 3	
- provided suggestions for further research	0 1 2 3	
- discussed conclusions	0 1 2 3	
- interpreted relevant statistical tests	0 1 2 3	
	________	SUBTOTAL 3

SUBTOTALS: (1)_____; (2)_____; (3)_____; **TOTAL SCORE**__________
Evaluator Comments:______________________________
____
____
____

APPENDIX E

STUDENT AND SPONSOR APPLICATION FORMS

PACIFIC REGION JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM
STUDENT APPLICATION

DIRECTIONS

A. Provide a complete answer in each blank.
B. Forward with a check in the amount of $40.00, payable to the Pacific Region Junior Science and Humanities Symposium.
C. Name should be printed.
D. Applications should arrive at the address provided below not later than 15 December.

1. Name & Social Security Number:______________________________

____

2. Grade:______________________________

3. Sex:______________________________

4. School Name:______________________________

5. Home Mailing Address:______________________________

____

6. Home Telephone Number:______________________________

7. JSHS Mentor's Name & Signature:______________________________

8. JSHS Sponsor's Name & Signature:______________________________

9. Principal/Asst. Principal Signature:______________________________

____

10. Mail To: Science Coordinator
DoDDS-Pacific/Education Division
PSC 556 Box 796
FPO AP 96372-0796

PACIFIC REGION JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM
SPONSOR APPLICATION

DIRECTIONS

A. Provide a complete answer in each blank.

B. Application should arrive at the address provided below not later than 15 December.

1. Name:____

2. Sex:____

3. School Name:____________________________________

4. Home Mailing Address:______________________________

____

5. Home Telephone Number:____________________________

6. Number of Students You Anticipate Bringing From Your School____________

7. School Administrator's Signature:______________________

8. Mail To: Science Coordinator
   DoDDS-Pacific/Education Division
   PSC 556 Box 796
   FPO AP 96372-0796

APPENDIX F

ORGANIZATION OF STUDENT PAPERS

ORGANIZATION OF STUDENT RESEARCH PAPERS

Research papers should include the following sections: Title, Abstract, Introduction, Methods or Procedures, Data or Findings, Discussion, Conclusions, Recommendations For Further Research, Literature Cited. Each paper must also have a Research Paper Cover Sheet.

1. TITLE: The project title is often the first item seen by potential readers. It should be concise, and as specific as possible. Titles should be chosen so that readers are convinced they should continue on, and read the Abstract. Some examples of titles meeting these criteria follow:

a. Determination of the Activation Energy and Order of Reaction for a Lightstick

b. The Effects of Slopes and Reefs on Water Waves

c. Ultraviolet Weathering of Polypropylene, an Example of a Photo-Chemical Process as a Function of Color

d. Mitotic Activity Associated with the Initiation of Budding in Hydra

2. ABSTRACT: Abstracts are usually found at the beginning of research reports. They provide readers with an overview of the research described in the report. Writers cite their research methods, findings, and conclusions in this section using sufficient detail to convince readers the entire report should be read. Some example abstracts can be found in Appendix G.

3. INTRODUCTION SECTION: A number of items are included in the Introduction section. First, what is already known about the research topic or problem, as reported in the literature (information found during a literature search), is described. As part of the description, the literature (report, article or book) containing the information from which the description originated, is cited. Citations here, and in other sections of the report, may be in one of two forms: (1) Jones (1989) found that.....; (2) It was noted that.......(Jones 1992). If readers want additional information about the work of Jones, they consult the Literature Cited section of the report to locate the complete citation for Jones' work. Some examples of citations are provided at the end of this section.

The second item in the Introduction section is the rationale for conducting the study (why was the study conducted?). If a rationale cannot be identified, the study should not have been conducted.

The third area covered in this section are hypotheses or research questions. These are the hypothesis/es a researcher intends to either accept or reject after analyzing research data, or they are the research questions to be answered as a result of the project. Hypotheses and sometimes, research questions have a statistical link; that is, a certain level of statistical significance is assigned to acceptance or rejection of an hypothesis or research question. An hypothesis, for example, might be accepted at $p<0.05$ level meaning that the probability of the observed phenomenon being caused by something other than chance alone is less than five chances in 100. All of the areas covered in the Introduction should be linked.

a. Schlitz and Bud (1993) stated their research produced little support for the conclusions drawn by Chesterfield (1991).

b. Evidence collected over the past forty years suggests the present atmospheric warming trend is occurring outside of normal atmospheric cycles (Miller 1994).

4. METHODS OR PROCEDURES SECTION: The methods or procedures used to conduct the research are described in this section. They should be reported as exactly as possible and in a step wise manner. This section should be written specifically enough so the research project could be replicated by someone not involved with the original project. Papers written to this degree of specificity are a credit to their writers, while papers reporting research studies that cannot be replicated are not worth reading. Figures which help describe the procedures may be included here. When included, the word "Figure" begins with a capital letter and is placed at the bottom of the Figure. An example follows:

INSERT DATA, PICTURES AND SO ON HERE

Figure 1. Atypical Arrangement of the Distilling Column.

5. DATA OR FINDINGS SECTION: The results of the research are reported here. They are described in writing, and may be supported by the inclusion of tables and figures. The inclusion of tables and figures as the sole method of reporting research findings, without the providing a written description of the findings is not an acceptable method of reporting study results. While tables and figures may be used to provide visual overviews of findings, research results must be described in writing. When tables are used, table titles are printed above the tables and the word, "Table," is always capitalized. When a table is discussed in the report, the word, "Table," is capitalized. The titles of figures are always printed under the figures. The same capitalization rules apply of the word, "Figure," as apply to the word, "Table." See the example figure above and the table below. One point students should remember is that the results are described here, not discussed.

Table 1
Hourly In Tide Pool Temperatures For Southwest Harbor
30 August 1993

Location	Time	Temperature(C)

6. DISCUSSION SECTION: Research findings are discussed here. Relationships between the findings, and what is already known about the research problem should be included here. Links between what is already known about the subject and the findings should be noted if they exist or appear to exist. What is already known about the research area was reported generally in the INTRODUCTION section. Thus, there should be a relationship between the DISCUSSION section and the INTRODUCTION section. Literature relevant to the discussion

should be cited in this section. Hypotheses or research questions are also discussed here. The discussion should take into account the research findings.

7. CONCLUSIONS SECTION: Researchers draw conclusions about research projects in this section. Conclusions must be based upon information presented in the DATA or FINDINGS section. This is often the place where hypotheses are either accepted of rejected based upon preset levels of statistical significance. Conclusions about research questions, when research questions are used in a study, are also made here. An important point to remember is that all conclusions made here are based upon evidence.

It is possible to combine this section with the Discussion Section, but we prefer that beginning researchers not follow the procedure even though some research papers they read may use that approach.

8. LIMITATIONS OF THE STUDY SECTION: Limitations which effect the generalizability of the research results are included here. Statistical techniques used to manipulate the data, for example, may not have been as powerful as expected, or incorrectly chosen. In such cases readers of a research paper should be cautioned about the possible effects incurred when the research results are applied to new situations. Some of the observed treatment effect might have been caused by a random, uncontrolled, intervening variable. Again, the reader should be made aware of the possibility. Other factors, over which the researcher had no control, that might have influenced the study outcomes, should be mentioned.

8. SUGGESTIONS FOR FURTHER RESEARCH SECTION: This is a list of suggestions which should be accomplished in additional research projects to help us better understand the area of research reported in the present paper. Additional research may seek to answer questions central or peripheral to the research discussed in the present report.

9. LITERATURE CITED OR REFERENCES SECTION: This a list of all documents cited in the context of the report. Citations are usually listed alphabetically by the authors' last names. When an author is cited more than once, his or her works are usually listed with the earliest publication date first. In cases where two or more articles by the same author, published during the same year are cited, small letters follow the date, starting with "a" and proceeding (1987a, 1987b). The letter is included in this section, and in the context of the report when the work of that author is discussed (see examples of dates in the INTRODUCTION section). If an article or a text is not cited in a report, it is not included in this section. Some example literature cited listings are provided below.

As an alternate style for listing citations this section, the format published in the, Publication Manual of the American Psychological Association, may be used.

REFERENCES

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NOTES

APPENDIX G

EXAMPLE ABSTRACTS

ABSTRACTS OF OUTSTANDING STUDENT PAPERS

NAME:	Cynthia A. Wares and Burt T. Hensley
HOME ADDRESS:	36th Signal Bn. Box 175 APO AP 96218
SCHOOL:	Taegu American School
SPONSOR/TEACHER:	Mrs. Nagy
TITLE:	How strong are spider webs?

The objective of our experiment was to test the strength of spider webs. We found that a web can hold around 192,000 times its weight. Using this information, spider webs can be used to support heavy objects.

To conduct this experiment, a device for testing web strength was needed. The way that we tested the webs was by tying one end of a web, being a certain mass and length, to a small basket that had the mass of 8 grams. The other end of the web was tied to a support. The web hung from the support and also had the 8 gram basket attached at its end.

It was discovered that a web having the mass of 0.0002 grams could hold up to an average of 38 grams. We hypothesized that if the web's mass was doubled, the strength of the web would also be doubled; our hypothesis was proven correct.

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NAME: Annie Lee
HOME ADDRESS: 121st Evac. Hosp., Box #322, APO AP 96205
SCHOOOL: Seoul American High School
MENTOR/SPONSOR: Major Rick Hoff/ Mrs. Samia Mounts
TITLE: The Prediction of the Buffering Capacity of a Malathion Contaminated Soil Through the Physical and Chemical Characterization of Five Uncontaminated Soils.

A serious problem exists with malathion contaminated soil on an Army installation in Korea. The malathion, which is unstable at extreme pH, will be degraded by raising the pH of te soil through addition of calcium hydroxide ($Ca(OH)2$). All soils have some ability to resist change in pH, or buffering capacity. Sources indicate that some soil chemical properties are related to their physical properties. It is hypothesized that the physical properties of soils can be related to their buffering capacities. Uncontaminated soils were collected and physical characterization was performed by sieve analysis and analysis of determined by a modified titration with sodium hydroxide ($NaOH$). A soil was selected whose physical characteristics best matched those of the contaminated soil. The chemical data from that soil was used to calculate a calcium hydroxide dose for the contaminated soil. Malathion contaminated soil was treated with the calculated hydroxide dose and it was found that the desired change in soil pH occurred.

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NAME: Alisa Duncan and Sara Craigmiles
HOME ADDRESS: PSC 473 Box 1 Code 004, FPO AP 96349-1100
USNH PSC 475 Box 1512, FPO AP 96350-1620
SCHOOL: Nile C. Kinnick High School
SPONSOR: LCDR William Lutrell
TITLE: Comparisons of Ambient Air Quality on the Miura Peninsula, Japan

Particulates suspended in air reduce the quality of the environment as well as cause health problems. The objective of this study was to determine if particulate concentrations on the Miura Peninsula, Japan, comply with EPA standards. In addition, concentrations were compared between four different sites on the peninsula and between weekdays and weekends.

Air samples were collected using air sampling pumps and filters in compliance with NIOSH methods. After the 12 hour sampling period, filters were weighed on an analytical balance to find the mass of the particulates. The filters were then processed for viewing under a phase contrast microscope, and particulates were counted and segregated by size. Concentrations were determined and compared using ANOVA, the F test, and the t-Test.

All total suspended particulate concentrations did not comply with EPA standards. The comparative air quality between the sites did not significantly differ, nor was there a significant statistical difference between weekday and weekend particulate concentrations.

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ABSTRACTS OF OUTSTANDING STUDENT PAPERS

NAME: David Potere
HOME ADDRESS: PSC 78 Box 3244; APO AP 96326-3244
SCHOOL: Yokota High School
SPONSOR/TEACHER: Roger Larson
TITLE: A Computer Aided Analysis of the Chaotic Patterns Present in Dripping Water

Chaos is the study of order present in non-periodic (random) dynamic systems found all throughout nature. It is a relatively new science. Serious chaos research began in the early 70's; therefore, many opportunities for ground breaking studies are open.

Dripping water has been chosen as the chaotic system for this project. Earlier studies have shown that chaotic patterns are embedded in the system. The research questions were as follows: Can chaos be found using simple laboratory equipment? If chaos is present, at what drip rates are the patterns most prominent in?

The following variables were controlled in the system: water pressure, water temperature, viscosity, aperture size, and outside vibrations. The time between drops was measured for ten drop rates between 0.01 and 1.2 drops per second. To gather the date, a photogate timing system capable of timing to one tenth of a millisecond was used in conjunction with an IBM 386 computer.

The data was analyzed in both a time versus run graph and a custom programmed return plot system in Pascal. Patterns were found embedded in the apparently completely random data by utilizing the return plot system. No absolute range could be found. Chaotic and periodic data was found in all of the time slots analyzed. However, the most chaotic drip rates during the thirty-four tests run occurred in three ranges: between 0.06 and 0.65 drops per second, between 0.15 and 0.4 drops per second, and between 0.65 and 0.94 drops per second.

This data is intended as baseline research to faciliate future research. By understanding the chaotic ranges, we can work to provide a more detailed understanding of the rich patterns present in the surpisingly complex dynamic system of dripping water.

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NAME: Tina A. Nolte
HOME ADDRESS: LAO-FE (AYSCOM) Unit 15293 APO AP 96205-0066
SCHOOL: Seoul American High School
SPONSOR/TEACHER: Samia Mounts
TITLE: The Effects of Ginseng on the Proliferation of Mammalian Cells in Culture

The literature regarding the effects of ginseng on cell replication is confusing. Ginseng seems to assist in the recovery of cell proliferation for normal cells, yet inhibits the proliferation of tumor cells. Very little is known about the effects of ginseng on studied on cultured cells, but no studies have looked at the effect of whole ginseng extract on cell proliferation. This study was undertaken to determine the effect of ginseng on mammalian cell proliferation in culture in order to gain some clues as to whether or not ginseng's effects on cell division are cell specific.

Whole ginseng powder stimulated the proliferation of the mouse, hamster, and monkey cells studied. This stimulatory effect is similar to that shown for the influence of isolated ginseng components on normal cell proliferation. Also, the cell types used in this study responded similarly to normal cells, because the ginseng effect was stimulatory and not inhibitory.

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NAME: Valerie A. Jorgenson and Sara B. Craigmiles
HOME ADDRESS: PSC 473 Box 95 FPO AP 96349 & PSC 475 Box 1512 FPO AP 96350
SCHOOL: Kinnick High School
SPONSOR/TEACHER: Fred Jensen
TITLE: Comparisons of the Amounts of Air Particulate at Four Different Locations on the Miura Peninsula

The amounts of particulate matter at different locations on the Miura Peninsula were quantified. In addition, particulates collected on weekdays were compared to the amounts of particulates collected on weekends. Finally, the four areas were compared to determine if the variance observed between weekdays and weekends was different.

Samples of particulate matter were collected on microscope slides over a period of twenty-four hours. This was repeated twenty separate times at each of four locations. The data was quantified by counting the number of small and large particulates using a microscope.

First, the total amount of particulates that settle out from the air varies by up to 23 percent, even though all collection sites were within eight kilometers. Further, the amount of small particulates and large particulates varied significantly among the sites. Secondly, the amount of both small and large particulate dropped on the weekends. However, the magnitude of drop in the small and large particulate varied significantly and independently between locations. For individuals suffering from respiratory ailments aggravated by particulate matter, there is no obvious criteria in trying to select a location to live except to avoid proximity to major highways.

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NAME:	Kim, Kate
HOME ADDRESS:	PSC Box 6349 APO SF 96366
SCHOOL:	Seoul American High School
MENTOR/SPONSER:	Mr. Ralph Babcock/Mrs. Samia Mounts
TITLE:	Nutrient Deficiencies in Plants

ABSTRACT:

Plants require essential chemical elements for normal growth and development. Tomato plants grown in a water culture technique (hydroponics) without a particular essential element shows the effect the lack of the nutrient has on certain features of its growth and development. Observations were made of the tomato plants during a four week period. The symptoms were observed by comparing plants grown in a deficient medium to the plant, which was grown a complete nutrient medium. The observed symptoms were particular to the missing nutrient, and proved to be characteristic of the deficiency of the plant. Deficiency symptoms can provide a guide for the type of nutrient which could be provided to supplement the deficiency.

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NAME: Luttrell, Daniel
HOME ADDRESS: USNH Box 65-1810 FPO Seattle, WA 98765-1600
SCHOOL: Nile C. Kinnick High School
MENTOR/SPONSOR: Mr. Fred Jensen
TITLE: AIRBORNE LEVELS OF PARTICLES IN AN OFFICE IN THE PRESENCE OF TOBACCO SMOKING

ABSTRACT:

In this study the objective was to determine if airborne levels of particles in an indoor environment in the presence of tobacco smoking were different from levels of particles in an indoor environment without tobacco smoking. Air samples were collected by using air sampling pumps, respirable dust samplers and filters in an indoor site in the presence of tobacco smoking and another indoor site with no smoking. In both cases respirable particles (<10 microns in size) and total particles (all sizes) were collected on filters. After sampling, the filters were viewed under a phase contrast microscope. Using mathematical analysis the concentrations of particles were determined. Shown to be statistically significant using the F-test ($p < 0.05$), the smoke contaminated field samples had greater average concentrations of respirable particles than the clean air counterpart samples. In light of studies published in the literature, there needs to be concern that a hazard may exist for individuals breathing second-hand tobacco smoke.

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Abstract

NAME: Granderson, Joshua V.
HOME ADDRESS: HQ FEAK Box 86, APO SF 96301
SCHOOL: Seoul American High School
SPONSOR: Major Patton/Ms. Mounts
TITLE: Asian, AmerAsian, and American Bilirubin Levels — a Statistical Comparison

Bilirubin is a reddish-yellow bile pigment produced in the breakdown of hemoglobin. The liver is responsible for collecting it and concentrating it in the gall bladder. When some disruption in this process occurs, jaundice results. In newborns, physiologic jaundice (caused by the liver's inability to process all bilirubin produced) is a very common condition.

This study measured the average levels of bilirubin in newborns with the aid of a Dupont Chemical Chemisty Analyser, then assigned them to one of three categories to which they belonged: Korean, AmerAsian, or American. The standard deviation and mean were used to determine statistical significance — to 95% probability — of differences determined. A difference of .1 mg/dl was found between categories (ranked in order): Korean, AmerAsian, and American. Differences between AmerAsian-Korean, and AmerAsian-American were found insignificant, but differences between Korean and American categories was found significant. The difference found, while too small to change medical judgement, demands further research to determine its origins — genetic or nutritional?

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ABSTRACTS OF OUTSTANDING STUDENT PAPERS OF JSHS 1990

NAME:	Julie Spencer
HOME ADDRESS:	APO San Francisco CA 96239 C/O Kadena High School
SCHOOL:	Kadena High School
SPONSOR/TEACHER:	Mr. Dennis Edwards
TITLE:	A Study of Blood Group Lectins as Found in Indigenous Okinawan Substances

The ABO blood system is composed of sugar structures on the membrances of human red blood cells. This system imparts the red blood cell antigenicity. Reactivity of human blood is often determined by cross-mixing of human blood, but sometimes other methods of determining subgroup specificity are required.

Lectins are proteins which recognize sugar structures on red cell membrances. They were originally isolated from plants and were found in large quantities in many seeds. Lectins are used as relatively inexpensive, easily stored, and low-risk substitutes for human red cells in determining specificity of blood.

The purpose of this research was to identify lectins in substances indigenous to Okinawa. Extractions were made from twenty-two substances. Nine of these twenty-two extractions proved to have agglutin properties, and two were specific. These two lectins, large lima beans and Echinometra mathaei type B sea urchin, reacted with selective cells and were found to have anti-A and anti-H specificity, respectively. In the future, Echinometra matheai type B lectin may also be used for subspecies identification.

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ABSTRACTS OF OUTSTANDING STUDENT PAPERS OF JSHS 1990

NAME: Anthony K. Olmsted
ADDRESS: USA EDFE Box #72 APO SF 96301-0427
SCHOOL: Seoul American High School
SPONSOR: Elizabeth Chan
TITLE: An Analysis of the Growth and Development of Mice Fed High-Protein Earthworm Meal

Earthworms are high in protein and provide fine nourishment for both animals and humans. The idea for this experiment came from a book on future protein sources. It says that earthworms are beneficial to animals and could be an alternate human food source.

Three tests using different age groups of mice as the subjects were conducted in order to prove the hypothesis that mice will grow larger and learn faster after having eaten earthworms. In a 3-week test, each animal was weighed alternate days and received 5 grams of food daily. In the last two tests, the mice ran through two mazes, one simple and one complex to establish time averages in testing the mice's learning abilities. The experiments were designed to show a difference in weight and maze times to prove that the worms are beneficial to mice. The control group increased in weight by 53% with an average maze time of 82.49 seconds, while the experimental group increased in weight by 75% with a maze time of 62.16 seconds.

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ABSTRACTS OF OUTSTANDING STUDENT PAPERS OF JSHS 1990

NAME: Wenimar Salvador & Chaviess McGillivray
HOME ADDRESS: PSC #3 Box 15515, APO San Francisco, CA 96342
SCHOOL: Wagner High School, Clark Air Base, Philippines
SPONSOR/TEACHER: Mr. Byron Wood
TITLE: The Effect of Growth Factors and Inhibitors on the Morphology E. coli

This research was conducted to determine the effects of growth factors and inhibitors on the morphology of E. coli.

Under normal conditions, E coli grows as small, gram-negative, bacillary cells. The bacteria was subjected to various growth factors, such as amino acids and glucose. In addition, the bacteria was exposed to growth inhibitors — antibiotics such as penicillin and tetracycline.

The results indicated that the metabolic processes of the E. coli are specific to the nutrients in the environment. It was found that it is possible for an introduced factor to inhibit a particular enzymatic process which synthetically produces a necessary component vital to the physiology of the bacteria.

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ABSTRACTS OF OUTSTANDING STUDENT PAPERS OF JSHS 1989

NAME: Stacy Waugh
HOME ADDRESS: PFO Seattle 98768-1809 C/O Zama High School
SCHOOL: Zama High School
SPONSOR/TEACHER: Terry McGinniss
TITLE: A Comparison of Attitudes Related to Prejudice in Stateside Students and Overses Students.

Prejudice has often been a major topic in the world. Even the Supreme Court kept the Blacks down for fifty eight years by the "separate but equal" laws. In 1954 the Supreme Court in Brown vs. Board of Education declared school segregation unconstitutional. That started to change the structure of racial degradation that swept the nation. Now 35 years later many changes have come around. Blacks and other racial groups play a major part in the make up of our society. The sad fact remains that racist attitudes still exist. Prejudice however not only includes racism; it has many forms, for example, sexism. In a world dominated with white males it has been very hard to compete for equality. This study is a comparison of prejudicial attitudes of stateside students vs. prejudicial attitudes of overseas students. The hypothesis was: If stateside and overseas schools are polled on attitudes related to prejudice, then the stateside school will demonstrate more prejudice than overseas student.

One hundred questionaires were passed out to sixteen and seventeen year olds attending Newport High School and one hundred questionaires were passed out to sixteen and seventeen year olds attending Zama High School. When the data was collected the study of prejudice demonstrated that Newport students had a higher prejudice rate than Zama students. Even though the evidence is not strong it still shows that Newport students have the tendency to be more prejudice than Zama students.

NAME: Hsun Hua Chou
HOME ADDRESS: PSC #1 Box 24141, APO San Francisco, CA 96230
SCHOOL: Kadena High School
SPONSOR: Mr. D. Edwards, Kadena High School
TITLE: The Effect of Changes in the Oxygen Content of Air Inhaled into the Human Body on the Amount of Oxygen Absorbed by the Body.

The purpose of this study was to examine whether changes in the oxygen content of air inhaled into the human body affects the amount of oxygen absorbed, and if so, how.

Under normal breathing conditions, a person inhales air consisting of approximately 21% oxygen and 79% introgen, with negligible amounts of carbon dioxide. The gases exhaled by a person consists about of 17% oxygen, 79% nitrogen, and 4% carbon dioxide, depending on the age. In the experiment, the concentration of oxygen inhaled into the body was altered by having a subject breathe through a specially designed mask. Samples of the exhaled gases were taken and analyzed by gas chromatrography. Five mixtures of gases with different concentrations of oxygen were used in the experiment.

The results showed that when the oxygen concentration of the inhaled gas is increased, the amount of oxygen retained by the body also increases; when the oxygen concentration of the inhaled gas is decreased, the amount of oxygen retained by the body also decreases, indicating that the amount of oxygen absorbed by the body is a function of the oxygen content of the inhaled gas.

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NAME: Haruka Itakura
HOME ADDRESS: 2-7 Hanazawa-cho, Kugenuma, Fujisawa-shi, Kanagawa-ken, Japan
SCHOOL: Zama American High School, Camp Zama, Japan
SPONSOR/TEACHER: Lee Forrest
TITLE: **The Effects of a Detergent Containing a Non-ionic Surfactant — Polyloxyethylene Alkyl Phenyl Ether on Killifish.**

A detergent containing a non-ionic surfactant — polyoxyethylene alkyl phenyl ether, currently sold on the Japanese market, claims to be harmless to humans. The object of this investigation was to determine if the detergent is, in fact, harmless. The validity of the claim was to be inferred from the effects it had on killifish.

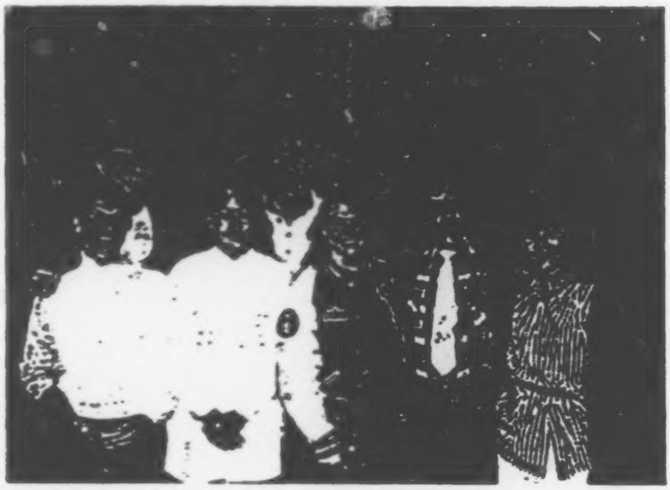
The experiment consisted of observing the effects of a solution of non-ionic surfactant on killifish at different concentration levels and comparing those effects with the effects of soap and detergent.

Results were that, at the two lowest levels, 30% of the fish died in the 4 ppm concentration solution and 50% in the 5 ppm concentration (37 hours LC = 500,000). No fish died in the soap and in the detergent solutions at higher concentration levels. The control group (0 ppm) remained unchanged and healthy.

It was concluded that the solution was lethal to killifish, the minimum lethal concentration level being 5 ppm, and that detergents such as this should be recognized for their potentially harmful effects on humans and the ecological environment.

NAME: William E. Wagner
HOME ADDRESS: PO Box 1863 Camp Foster
SCHOOL: Kubasaki High School
SPONSOR/TEACHER: Jane Larson
TITLE: **The Effect of Visual Stimulation on a Bicycler's Performance.**

This research attempted to determine whether video stimulation can cause an increase in a rider's speed on an exercise bike. Two tests were performed, one without the visual stimulation and one with the visual stimulation. A video tape of two minutes duration was prepared by filming progress on a road by a rider in a car. Speed varied from twenty kph during the first minute to forty kph the second minute. Subjects performed two tests by pedaling an exercise bike, first with no visual stimulation, and then watching the video in front of the bicycle. The speedometer reading was recorded every fifteen seconds. It was found that subjects pedaled at a steady pace without the visual stimulation. The subjects slightly changed their speed according to ideomotor responses to the video. The t-test showed no significant difference in speeds attained with and without watching the video.



From L to R
Haruka Itakura, Mr. Anthony Ferrante, Stacy Waugh, Mr. Dennis Edwards, Hsun Hua Chou, William Wagner and Mrs. Jane Larson.

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1982 PACIFIC REGION JSHS

TSUKUBA IBARAKI PREFECTURE, JAPAN

NAME: Sutton Michael S.
HOME ADDRESS: PSC Box 5779, APO San Francisco CA 96519
SCHOOL: Robert D. Edgren High School
SPONSOR/TEACHER: Mr. Robert Manning/Dr. Charles Solberg
TITLE: An Investigation to Determine if There is A Correlation Between Long-Distance Running and Academic Achievement

The objective of this research was to determine if there is a correlation between long-distance running and academic achievement in high school. The procedure was to use grade point averages of cross-country runners and non-team students. By comparing the grade point averages of the runners and the grade point averages of the non-team students, it was found that the runners as a group, had the higher grade point average. Dr. Kenneth Cooper's classification for the 1.5 miles aerobic test were used as a basis for ratings cross-country runners into fast and slow categories. By comparing the fast runners' grade point averages to the slow runners' grade point averages, it was found that the group average was higher for the fast category. If evidence of a significant positive correlation between long-distance running and academic achievement is shown through further analysis, the research will be expanded to try to determine the reason this correlation exists.

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TSUKUBA IBARAKI PREFECTURE, JAPAN

Name: Ngo, J. Thomas
HOME ADDRESS: PSC #3, Box 15658, APO, San Francisco 96432
SCHOOL: Wagner High School
SPONSOR/TEACHER: Mr. Garold Means
TITLE: Computer Simulation of Lunar Capture

Three major theories are now used to explain the origin of the moon. One of these is the theory that the moon accreted separately from the earth, and became its satelite by being captured in the earth's gravitational force field. A computer simulation was used to deremine how feasible such a capture would be. None of the trials showed a successful capture because the earth attracted the moon prior to the calculated rendezvous, causing it to pass very close to the earth and accelerate in an unplanned way. The researcher lacked the mathematics required to preform such predictions; research halted.

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APPENDIX H

RESEARCH PROPOSAL EVALUATION FORM

DIRECTIONS: Assignment of points within categories is left to the discretion of individual evaluators.

NOTES

PACIFIC REGION JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM
RESEARCH PROPOSAL EVALUATION FORM

Name of Student: ______________________________

Research Proposal Title: ______________________________

____

Note! All items in the criteria column are evaluated both on the students poster and on his or her informal presentation to fellow students and others.

	POINTS	CRITERIA
________	___45___	I. Quality of Research Design
	________	a. Is the problem well stated and delimited?
	________	b. Are the variables identified?
	________	c. Is there a recognition that measurements are limited?
	________	d. Will there be sufficient data to support decisions that must be made?
	________	e. Is the statistical analysis appropriate to the experience of the student researcher?
________	___25___	II. Originality of Topic or Approach
	________	a. Is the topic suitable for grade 9 research?
	________	b. Is there evidence that the majority of the work was accomplished by the student?
________	___30___	III. Scientific Understanding Displayed
	________	a. Are significant details emphasized?
	________	b. Is the researcher objective?
	________	c. Are limitations of the study considered?
	________	d. Will conclusions be based upon evidence?

Other Evaluator Comments: ______________________________

APPENDIX I

RESEARCH PAPER COVER SHEET

RESEARCH PAPER COVER SHEET

1. Research Paper Title: ______________________________

____

____

2. Grade of the Submitter: ______________________________

3. Number: ______________________________

DIRECTIONS: Fill in only the title. The number section should be left blank.

APPENDIX J

LIST OF AVAILABLE VIDEO TAPES TO HELP STUDENTS PREPARE FOR THE SYMPOSIUM

AVAILABLE VIDEO TAPES

Several video tapes are available to help students prepare for the Symposium and to help them with their research. They are listed below:

1. "The Scientific Method" This is a detailed discussion of the scientific method and the research process by Dr. Howard Liljestrand of the University of Texas at Austin.

2. "Student Presentations" - Usually several tapes are available under this title. These tapes cover the actual formal presentations made by students at the Symposium the previous year.

3. "Field Trips" These tapes cover the field trips taken by symposium students the previous year.

4. "Guest Speaker" This the keynote speakers address from the previous year.

5. "Japanese - American Cultural Interchange" This tape covers the Japanese-American party usually held on Wednesday evening of the Symposium week.

6. "Poster Sessions" These tapes cover the informal presentations made the previous year by participants of the poster sessions.

7. "Reception" This tape covers the Symposium opening night reception.

The tapes may be borrowed from the District Superintendent of Schools for Japan. To obtain copies or borrow the tapes, contact the District Superintendent of Schools, Japan at DSN 225-3940/3941/3946/3947. Individuals interested in obtaining copies of the tapes, must provide DSO Japan with blank tapes.

NOTES

APPENDIX K

EXAMPLE TRAVEL ORDERS

(THIS FORM IS SUBJECT TO THE PRIVACY ACT OF 1974 - USE BLANKET PAS - AF FORM 11.)

REQUEST AND AUTHORIZATION FOR TDY TRAVEL OF DOD PERSONNEL

(Reference: Joint Travel Regulations)

Travel Authorized as Indicated in Items 2 through 21.

1. DATE OF REQUEST

REQUEST FOR OFFICIAL TRAVEL

2. NAME *(Last, First, Middle Initial)* AND SSAN DOE, JOHN 556-43-3001	3. POSITION TITLE AND GRADE OR RATING TEACHER, GS-12
4. OFFICIAL STATION KADENA AB, ANNEX #2, JAPAN	5. ORGANIZATIONAL ELEMENT
6. PHONE NO. 999-9999	
7. TYPE OF ORDERS ROUTINE	8. SECURITY CLEARANCE N/A
9. PURPOSE OF TDY	
10a. APPROX. NO. OF DAYS OF TDY *(Including travel time)*	b. PROCEED O/A *(Date)*

11. ITINERARY ☒ VARIATION AUTHORIZED

DEPART FROM: Local Base Where School is Located

TO: YOKOTA AIR BASE, JAPAN

RETURN TO: Local Base Where School is Located

12. MODE OF TRANSPORTATION

COMMERCIAL				GOVERNMENT		
RAIL	AIR	BUS	SHIP	AIR	VEHICLE	SHIP
X	X	X		X	X	

☒ AS DETERMINED BY APPROPRIATE TRANSPORTATION OFFICER *(Overseas Travel only)*

PRIVATELY OWNED CONVEYANCE *(Check one)*

RATE PER MILE:

☐ MORE ADVANTAGEOUS TO GOVERNMENT

☐ MILEAGE REIMBURSEMENT AND PER DIEM LIMITED TO CONSTRUCTIVE COST OF COMMON CARRIER TRANSPORTATION AND RELATED PER DIEM AS DETERMINED IN JTR. TRAVEL TIME LIMITED AS INDICATED IN JTR.

13. ☑ PER DIEM AUTHORIZED IN ACCORDANCE WITH JTR.

☐ OTHER RATE OF PER DIEM *(Specify)*

14. ESTIMATED COST				15. ADVANCE AUTHORIZED
PER DIEM	TRAVEL	OTHER	TOTAL	
$	$	$	$	$

16. REMARKS *(Use this space for special requirements, leave, superior or 1st-class accommodations, excess baggage, registration fees, etc.) (Prior to travel overseas comply with the Foreign Clearance Guide for passport, immunization, and clearance requirements. Attach receipts showing cost of all lodgings used during the period of this claim.* SUBMIT TRAVEL VOUCHER WITHIN 5 WORKDAYS AFTER COMPLETION OF TRAVEL.)

LIMITED PER DIEM OF $3.50 PER DAY IS AUTHORIZED FROM 1500 HOURS (SYMPOSIUM MONDAY) THROUGH 1200 HOURS (SYMPOSIUM FRIDAY). FULL PER DIEM IS AUTHORIZED FOR THE REMAINDER OF THE TEMPORARY DUTY PERIOD.

17. REQUESTING OFFICIAL *(Title and signature)*

18. APPROVING OFFICIAL *(Title and signature)*

AUTHORIZATION

19. ACCOUNTING CITATION

DIST: (AS PER PRESENT REGION/DISTRICT FUNDING DOCUMENT)

20. ORDER AUTHORIZING OFFICIAL *(Title and signature)* OR AUTHENTICATION

21. DATE ISSUED

22. TRAVEL ORDER NUMBER

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DD FORM 1 JUN 67 1610 REPLACES AF FORM 626, JUN 76, WHICH IS OBSOLETE.

*U.S. GOVERNMENT PRINTING OFFICE: 1988-201-372:80649

NOTE: Only those items referenced in the order are applicable.

1. The verbal orders of the commander on (date shown in the proceed a/o date" block) are confirmed, exigencies precluded written orders in advance. (Do not use this statement on blanket/repeated TDY orders).

2. Justification for determining the special authorization(s) in this order is maintained in: (Office that maintains AF Form 1820) DoDDS-Pacific Fiscal Division

a. TPA. This mode has been determined more advantageous to government.

b. Reimbursement of transportation expenses necessarily incurred in the conduct of official business in and around duty station is authorized.

c. Excess baggage of pieces is authorized.

d. Hire of special conveyance for use within area of TDY station authorized as more advantageous to the government.

e. Hire of special conveyance authorized as more advantageous to the government.

f. Billing for the hire of GSA vehicles along with a copy of this order will be sent to (complete name and address of organization to be billed, and the billed office address code (BOAC) when it is available).

g. Travel is authorized by commercial air to and form CONUS per approval of:

3. Since your per diem payment is based on the availability of government quarters and mess, contact the base billeting officer to see if they are available.

4. Travel permitted by this order doesn't entitle traveler to expenses of travel or per diem.

5. Submit a travel voucher within 5 workdays after return from travel.

6. Submit a No-Pay travel voucher within 5 workdays after completion of travel.

7. Member is authorized special leave and space required transportation to the nearest port in the 48 contiguous states and return transportation from the port to the permanent duty station. Submit No-Pay travel voucher within 5 workdays after completion of travel. AUTHORITY: 10 USC 705 and AFR 35-9.

8. Pursuant to AFR 35-15, you will report to the Base Housing Referral Office servicing your new duty station before entering into any rental, lease, or purchase agreement for off base housing.

9. Individual is on authorized absence from duty traveling at personal expense and eligible for military furlough fare discounts.

10. Travel in connection with meetings according to AFR 35-9 not authorized by this order unless so amended or endorsed according to AFR 35-9 (Use on blanket orders).

11. Government procured transportation directed. If government transportation is not available, a statement of nonavailability must be obtained from TMO.

12. Travel by is directed.

13. Within overseas area of TDY, travel by military and commercial-aircraft, commercial rail, commercial ferry, and bus is authorized.

14. Travel by commercial rail, bus or air is authorized within CONUS.

15. Members will be performing duty off an installation of the uniformed services.

16. Traveler is authorized to make own travel arrangements.

17. Commercially procured transoceanic travel is authorized.

18. Use of available government quarters will adversely affect the mission at Clark AB, RP.

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APPENDIX L

LIST OF JSHS COORDINATORS IN OTHER JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM REGIONS

THE U.S. ARMY"S JUNIOR SCIENCE & HUMANITIES SYMPOSIA

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APPENDIX M

RESEARCH PROPOSAL FORMAT AND WRITING GUIDANCE

RESEARCH PROPOSAL FORMAT AND WRITING GUIDANCE

INTRODUCTION

Each year, thousands of high school students across the United States conduct experimental research projects as part of high school science fairs, and large research programs like the Junior Science and Humanities Symposium and the Westinghouse Talent Search. Each high school in the Department of Defense Dependents Schools Pacific Region participates annually in the Junior Science and Humanities Symposium Program. To be part of the Symposium program, participants must conduct an experimental research project, write research reports, and subsequently present their research to other student researchers.

Experimental research has at least two goals. First, researchers attempt to replicate studies previously conducted by other researchers. Their intent is to determine whether identical or nearly identical results can be obtained when a study is conducted again. Additional research results, if they are similar to the original results, support the original findings. When trends like this appear theories develop. A theory, as we know, predicts the outcome of events prior to their occurrences. We must remember, however, that generally scientists theorize only after a large body of similar experimental results have been amassed.

Second, and an equally important goal in the research community, is to answer questions by conducting original research. Original research provides us with new understanding of phenomena under investigation.

Symposium researchers are encouraged to pursue original research. Getting started, however, is not easy. When students begin their research, they frequently fail to use the systematic techniques and procedures used in the research community. This failure often leads to research results and subsequent interpretations that are flawed. How can we help students avoid such flaws? By developing and evaluating research proposals before beginning the data collection phase of a research project, some of these shortcomings may be avoided.

Research proposals serve a number of purposes. They are used by investigators when project funding is sought from agencies such as, the National Science Foundation. Proposals are also used by college researchers when proposed projects are to be scrutinized, for problems, by their colleagues.

There are many proposal forms. The one used depends upon the group who must pass judgment on the worth of the proposed research. In the following paragraphs, we discuss a form which is especially useful to beginning high school researchers. Our model includes the following sections: Title Page; Introduction; Hypothesis or Research Question; Research Design; Literature Cited.

PRESENTATION

In research, many tasks are accomplished prior to data collection. The first task is observation of the environment. Observations lead to identification of problems or recognition of events which seem out of place or odd under prevailing circumstances.

A second task is a literature search. Literature searches help investigators learn what is known about an apparent problem, and provide the background needed to conduct subsequent research. A literature search often drives the research. They lead or help to identify possible cause and effect relationships identified in a problem, thereby aiding formulation of hypotheses or research questions. Literature searches also help identify variables to be controlled when data are collected. Thus, as the experimental research designs are set up, literature search information becomes extremely important.

Research proposals are written and circulated to colleagues for comment after a literature search has been completed. Student colleagues are asked to read the proposals, comment upon project completeness, and make suggestions for project improvement. The major intent of the research proposal sequence is to help student researchers identify project problems, like the failure to control a particular variable, early in a research project. If problems are corrected early, the strength of research findings is increased and students' research presentations are of greater value to their fellow students. Once written, research proposals become a major portion of a students' final research reports. Let's look at our research proposal format.

THE RESEARCH PROPOSAL FORMAT

Title Page. The research proposal title page includes the research project title, the researcher's name and the name of the school where the researcher is a student. The project title is the first thing readers see. It should describe the project as completely and succinctly as possible and convey the message that the report contains something significant. The title becomes the title of the final research report. It is also used in the research report "Abstract".

Introduction. A proposal introduction section includes identification of a research problem, the history of the problem as reported in the literature, and the rationale for conducting the project. Literature, used to develop the historical overview and rationale, is cited in this section using standard citing procedures (Schlenker 1989, 1991). Documents cited here are also listed in a, "Literature Cited", section at the end of the proposal. The problem history and researcher observations of the environment are used to draft the project conduct rationale. Once completed, this section, with the inclusion of hypotheses or research questions, becomes the "Introduction" section of the final research report. Moreover, information from this section may also be included in the "Abstract" of the final report.

Hypotheses Or Research Question Section. This section contains the hypotheses to be evaluated or the research questions to be answered through research project data analysis. Both hypotheses and research questions are mentioned since both are found in research. When a researcher hypothesizes, it is appropriate to include the level of statistical significance above which the hypothesis will be accepted or rejected (for example, an hypothesis will be accepted or rejected at $p> 0.001$). Much of the information in this section is eventually incorporated in the, "Abstract, Introduction", and "Discussion" sections of the final report.

Research Design Section. Here, a researcher describes the experimental design to be used when data are collected. The design is described in writing and may be supported by figures. It should be described in detail sufficient to allow someone other than the person writing the proposal to replicate the study. An example research design is shown in Figure 1. In the design, factors: "A" and "a"

	ABC	ABc	Abc	abc
XYZ	ABC XYZ	ABc XYZ	Abc XYZ	abc XYZ
XYz	ABC XYz	ABc XYz	Abc XYz	abc XYz
Xyz	ABC Xyz	ABc Xyz	Abc Xyz	abc Xyz
xyz	ABC xyz	ABc xyz	Abc xyz	abc xyz

Figure 1. An Example 3 x 3 Factorial Design Showing The Manipulation Of Variables To Produce Various Experimental Combinations.

might represent sexes; "B" and "b" might represent litter sizes of less than four and greater than four; "C" and "c" might represent maternal age at birth greater than three years and maternal age at birth less than three years; "X" and "x" might represent all juveniles having the same father and all juveniles that do not have the same father; "Y" and "y" might represent all juveniles have the same mother and all juveniles that do not have the same mother; "Z" and "z" might represent juveniles raised on a high protein diet and juveniles raised a low protein diet.

Any other factors that have the potential to alter project outcomes, such as, control of environmental temperature and humidity, should be discussed here. A description of how the variables or factors are to be controlled should be included in this section of the proposal.

Equipment used in the research may also be listed in this section. When it is used, as described in the manufacturer's literature, a further operational description is not necessary. For example, a detailed description of how a Nansen bottle is lowered to a depth of ten meters below the seawater surface, tripped, and returned to the surface with its water sample, is not needed because the manufacturer's guidelines are being followed. On the other hand, if the equipment is used in an atypical manner, however, the way in which it is employed must be described. If a string of Nansen bottles,for example, is suspended at an angle of 45 degrees from the surface platform and not tripped until a specific dinoflagellate population reaches a certain population density per cubic centimeter of seawater, then the details of the bottles use must be described since the procedure is not considered one of normal use..

Once the research has been completed, this section, with changes made during the data collection phase of the research project, becomes the "Methods or Procedures" section of the research report.

Literature Cited Section. All literature cited in the context of the of the research proposal is listed here, usually alphabetically by the author's last name here. If a document is not cited in the context of the proposal, it is not listed here even though the researcher may have referred to the document during the conduct of the project. Examples of citation methods can be found in Schlenker (1989, 1991). This section becomes the "Literature Cited" section of the final research report.

SUMMARY

Research proposals are integrated as parts of research projects. They are drafted prior to beginning the data collection phase of a project and intended to identify project shortfalls prior to the time the research is actually conducted. When used correctly, the proposals help researchers conduct more highly controlled projects than would otherwise possible. Theses are accomplished using objective project input from colleagues not intimately involved with a project. Large portions of research proposals become parts of final research reports.

If your students have trouble getting started with their research projects or their projects are not as tightly controlled as you think they should be, why not have them write research proposals and have them use the proposals to obtain colleague input prior to the time they begin collecting data?

LITERATURE CITED

Schlenker, R. M. Junior science and humanities symposium and student research report writing. The Journal 2(2), 24-27, November/December 1989.

Schlenker, R. M. Student research report writing. American Biology Teacher, 52(8), 491-492, March 1991.

APPENDIX N

GUIDELINES FOR AND INFORMATION ABOUT THE NATIONAL JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM

JSHS

THE NATIONAL JUNIOR SCIENCE AND HUMANITIES SYMPOSIA PROGRAM

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HISTORY

Established in 1958, the National Junior Science and Humanities Symposia (JSHS) Program has a long tradition of excellence in encouraging scientific research and achievement. The first symposium, held at Duke University, was the concept of an Army officer and researcher Colonel George F. Leist, and a scientist and educator Dr. Sherwood Githens. Recognizing the nation's needs for educated scientists, the Army has continued its support through the U.S. Army Research Office, Research Triangle Park, North Carolina.

The JSHS has grown to a National program reaching over 10,000 secondary school students and teachers each year. The academic nature of the symposium, the scholarship of the students' original scientific research, and the opportunities presented by senior scientists in the governmental, academic, and industrial communities have made JSHS a unique and prestigious educational event.

JSHS OBJECTIVES

JSHS encourages secondary school students to develop their interest in the sciences and discusses the interrelationship of the humanities to this knowledge. Students may present their original research projects to the symposium and receive public recognition for their achievements. The program objectives are:

To promote research and experimentation in the sciences, mathematics, and engineering at the high school level.

To recognize the significance of research in human affairs, and the importance of humane and ethical principles in the application of research results.

To search out talented youth and their teachers, recognize their accomplishments at symposia and encourage their continued interest and participation in the sciences, mathematics, and engineering.

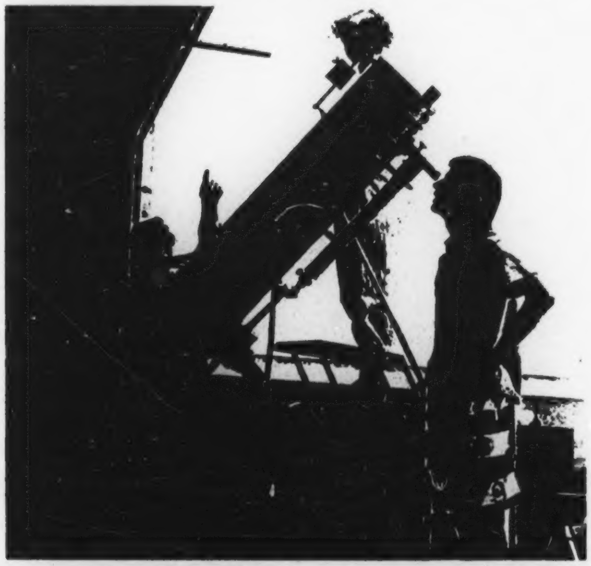
To expand the horizons of research-oriented students by exposing them to opportunities in the academic, industrial, and governmental communities.

To increase the number of future adults capable of conducting research and development.

THE REGIONAL SYMPOSIA

Forty-six regional symposia are conducted on university campuses under the leadership of committed individuals concerned with science education. The National Program encompasses symposia reaching high schools in the 48 contiguous states, Puerto Rico, and in the DoD Dependents Schools of Europe and the Pacific.

Each 1-3 day symposium brings several hundred students and teachers to university campuses to discuss opportunities in research — in science, engineering, and mathematics — and its impact on humanity. The students benefit from interacting with their peers and with professional scientists and from the opportunity to present papers describing their original research. All symposium participants, students and teachers, join in discussion and debate with distinguished scientists and humanists on current research topics and observe research in progress at tours of university, government, or corporate research laboratories.



THE NATIONAL SYMPOSIUM

Students who present their original scientific research at the regional symposium may compete and, if selected, advance to the National JSHS. The National JSHS is held annually in May, alternating between the U.S. Military Academy, West Point, NY, and a selected educational institution. National symposium attendees participate in a scientific and educational program bringing together over 350 students and educators from across the nation. Five delegates from each regional symposium attend, and one regional delegate competes with forty-six student researchers for international awards and scholarships.

JSHS SCHOLARSHIPS AND AWARDS

Regional symposia. Students presenting original research projects at the symposia are selected for recognition by a panel of experts. Each year, the regional symposia present scholarship awards totaling $90,000, certificates of recognition, and other awards. Scholarships and awards are contributed by the university host, the Academy of Applied Science, and other private contributors.

Faculty awards. The U.S. Army awards a $300.00 faculty award to the teacher and school of the top student researcher at each symposium. This award is in recognition of the teacher's contributions to the encouragement of science research.

National symposium. The U.S. Army supports an expense-paid trip to the National JSHS for five students selected from each of the forty-six regional symposia. One student from each regional delegation is selected to present his or her research paper at National in competition for the London International Youth Science Forum, presented by the U.S. Army, and for scholarship awards contributed by the Academy of Applied Science.

London International Youth Science Forum. The U.S. Army supports an expense-paid trip to the London International Youth Science Forum for the winners of the National JSHS research paper competition. The London Forum brings together over 300 students from 50 nations in an atmosphere of scientific and cultural cooperation. This two-week program is held at London University in July.

ADVISORY COUNCIL

The Academy of Applied Science has established the JSHS National Advisory Council, comprised of distinguished individuals within education, industry, and government. The Council membership is concerned with science and mathematics education in the secondary school system and seeks to broaden opportunities through the JSHS.

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HOW TO PARTICIPATE

University Directors of JSHS regional symposia invite high schools within their geographic area to nominate student and teacher participation. Students are encouraged to pursue scientific research projects. However, any student who displays an interest or an aptitude for science is eligible to attend either as a participant or as a paper presenter.

The Symposium Director forwards application forms to area schools, requesting nominations for symposium participants and paper presenters. Students who wish to present their original research to the symposium are asked to complete a paper according to the regional guidelines and submit it with the completed nomination form. A symposium review committee will first select those papers for presentation at the regional; then, during the oral presentations, the finalists who will attend the National are selected.

JSHS strives to provide this opportunity to as many students and teachers as possible and achieve its primary objectives — the recognition and encouragement of science. Interested students should discuss participation in JSHS with their science teachers. Teachers are encouraged to participate in this academic enrichment program and may obtain guidance from the Regional Symposium Director or the Academy of Applied Science.

ABOUT THE ACADEMY

The Academy of Applied Science is a private, non-profit organization, incorporated in 1963, with educational and scientific purposes and a major commitment to innovation. Since 1977, the Academy has administered the National JSHS Program, under contract with the U.S. Army Research Office. Other educational programs include New Hampshire's Young Inventor's Program, Science and Technology Expo, and Tech Prep Program, and the U.S. Army sponsored Research and Engineering Apprenticeship Program. The Academy's Center for Education and Development is recognized regionally as an educational resource center, offering enrichment programs for students, and professional development for teachers and educational administrators in mathematics, science, invention, and the integration of new technologies into education. The Academy collaborates with private and governmental groups in providing its innovative programs and in the promotion of science and technology education at all grade levels.

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Regional Sponsors

Alabama Junior Academy
  of Science
Arkansas Tech University
California Museum of
  Science and Industry
Drexel Univ.
Georgetown Univ.
Indiana State Univ.
Louisiana State Univ.
Loyola Univ. at Chicago
Minnesota Academy of Science
Monmouth College
Oregon State Univ.
Pennsylvania State Univ.
Rutgers Univ.
Seattle Pacific Univ.
Southern Illinois Univ.
St. John's Univ.
State Univ. of New York-Albany
U.S. Dependent Schools
  -European Area
U.S. Dependent Schools
  -Pacific Area
Univ. of California-Berkeley;
  U.C.-Davis
Univ. of Connecticut
Univ. of Delaware
Univ. of Florida
Univ. of Georgia
Univ. of Iowa
Univ. of Kansas
Univ. of Louisville
Univ. of Maryland, College Park
Univ. of Massachusetts
Univ. of Mississippi
Univ. of Missouri-St. Louis
Univ. of Nevada
Univ. of New Hampshire
Univ. of New Mexico
Univ. of North Carolina:
  N.C. State University
Univ. of Puerto Rico
Univ. of South Carolina
Univ. of Tennessee
Univ. of Toledo
Univ. of Texas-Austin
Univ. of Utah
Univ. of Wisconsin-LaCrosse
Univ. of Wisconsin-Madison
Univ. of Wyoming
Virginia Polytechnic Institute
Wayne State Univ.
West Virginia Wesleyan College

The Academy of Applied Science welcomes inquires for further information on JSHS. Please direct requests to:

JSHS National Office
Academy of Applied Science
98 Washington Street
Concord, New Hampshire 03301

To obtain application guidance for the regional symposium in your area, please contact:

Funded by
The U.S. Army Research Office
Research Triangle Park, NC

Administered by
The Academy of Applied Science
and Higher Education

JSHS participation is recognized by the National Association of Secondary School Principals in their Advisory List of National Contests and Activities.

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Student Guidelines for the Presentation of Research Papers

at the

National Junior Science and Humanities Symposium

At the National JSHS, students will present original research papers in a format similar to professional meetings of scientists and engineers. The National presentations concisely report the results of personal research efforts. Students should demonstrate skill in communicating to the audience the research problem, the approach to solving the problem, and the research results.

1. Submission of Papers

National student presenters must prepare an (1) abstract of 175 words or less, and (2) a research paper. All student abstracts are published and distributed at the symposium. The paper is not published but is used as a supporting document during the judging process. Judges will refer to the paper if questions arise about the nature of the research project. The research paper should be about 5-6 typewritten, double-spaced pages. Elaborate papers are neither necessary nor desired. However, if the student previously wrote a longer paper, he or she does not need to rewrite in the shortened format.

The research paper should include a specific title, a statement on where and when the research was done, and acknowledgement of major assistance received. Additionally, explain any special use of expensive or professional-quality laboratory equipment. It is helpful to present details illustrating the research procedures and results through graphs, figures, tables, diagrams, drawings, charts, or photographs. Do make these presentations simple and neat; use black ink whenever possible.

The JSHS Regional Director will provide instructions for preparation and submission of the abstract to the National JSHS Office. Students can turn in the research papers during registration at the National.

2. Presentation of Papers

a. Audio-visuals. Available audio-visual equipment during the National presentations includes chalkboard or whiteboard, 35 mm slide projectors with remote control, overhead projectors, and videocassette recorders (if requested). (Please see restricted guidance for using VCR's.) An opaque projector is not allowed. "Session Moderators" will be assigned and help student speakers with set-up of audio-visual equipment; however, equipment operators are not provided. If helpful, students may get help from a teacher or fellow student, especially when using overhead projectors. Students should number visuals in sequence so an assisting operator or the presenter can easily reshow one. Many times, visuals are reshown during the questioning period.

Restrictions on using audio-visuals include. The chalkboard (or whiteboard) must be blank at the start of the presentation. No written handouts are permitted. Additionally, research apparatus may not be brought to the symposium or exhibited.

b. VCR Usage. Students using VCR's during their presentation must abide by the following rules. Improper use of videos will not only detract from the oral presentation but also could affect evaluation by the judges.

(1) Only VHS, 1/2" tape, format is permitted.
(2) A video component cannot make up more than two (2) minutes of the presentation.

(3) No audio or background music is permitted other than sounds that are an integral part of the research. Recorded or mechanically produced narration is not permitted. Narration must be done in person by the speaker.

(4) Videos (and audio, if any) may be used for those aspects of the research design or scheme that cannot adequately be presented by slides, overheads, or on a chalkboard. Video material presented must be an integral part of the research and should not be a substitute for presentation of data. Videos must not be used for presentation of common procedures, illustrating equipment or showing laboratory facilities. Videos should illustrate work that was done and should not be used for stimulation or esthetic value.

(5) If using videos, notify the National JSHS Office three weeks in advance of the meeting to allow for availability of equipment.

c. Time Limits for Presentation. The research presentation may not exceed 15 minutes, followed by a maximum 10-minute question period. A session moderator will aid the student speaker in maintaining this schedule and in fielding questions from the audience. The procedure for maintaining the time includes a 12-minute signal for the student, and finally a 15-minute signal. At the 15-minute point, the student speaker must stop the presentation even if he or she has not finished. Following the presentation, the session moderator will ask for audience questions. The speaker may entertain questions while the exchange appears interesting and relevant. Questions intended to harass the student speakers will not be allowed by the session moderator. The speaker should repeat a question before answering so the audience may understand the entire dialogue.

d. Acknowledgement. The student speaker must acknowledge during the presentation any direct assistance received for the research project. As a researcher, the student is neither rewarded nor penalized by the judges for utilizing special advisors or equipment.

3. Suggestions for the Presentation.

Planning the presentation and knowing the audience are two important points for any presentation. As recommended by Dr. Laurie A. Lyon in the publication, Guidelines for High School Students on Conducting Research in the Sciences, "the presentation is based on the outline used for the research paper but should not include as much detail." "A possible outline for a paper may include: title of the project, description of the procedures used, description of the instrumentation used or apparatus designed, presentation of data, analysis of the data, results and conclusions, bibliography, and acknowledgement of assistance received."

An example of "limited detail" may be a reference to a procedure used in the research. Normally, stating the method or process used is adequate. Graphs are another example of presenting detailed data in a "limited" format. The speaker should, however, describe the graph to the audience. Further, he or she should name the variables on both axes of the graph, even if labeled, and state the significance of the position and shape of the graph line. If presenting the tabulation of numerical values, explain the significance of the values. The use of visuals is effective when kept simple. Visuals are effective presentation tools that assist the speaker in clarifying points to the audience. Speakers should use visuals to their advantage by taking time to interpret each, unhurriedly, and state what it means. Do not read the visual word for word; rather, interpret the visual for the audience.

Students should be aware of the level of experience and preparation of the audience, including fellow students, teachers, and judges. Most of the audience will not have specialized knowledge on

JUNIOR SCIENCE AND HUMANITIES JUDGING CRITERIA

STUDENT'S NAME: ________________________ SESSION__________

I. THE STUDENT'S INVOLVEMENT WITH SCIENCE

Problem and Hypothesis (10)_____
  Extent of Student's Involvement in Identifying Problem and Hypothesis
  Originality

Background Information and Prior Research (10)_____
  Demonstration of Knowledge
  Acknowledgement of Sources

Design of Investigation (10)_____
  Extent of Student's Involvement in Designing the Procedures

Investigative Procedures (20)_____
  Observations/Measurements/Data Gathering
  Laboratory Skills and Techniques
  Control of Variables
  Problem Solving
  Processing of Data, Statistical Analysis
  Interpretation of Data
  Conclusions Supported by Data

Significance, Applications, Next Steps (10)_____
  Importance, Applications
  Future Research

Overall Creativity (10)_____

TOTAL (70)_____

II. THE STUDENT'S EFFORT AND PERFORMANCE

Duration of Project (10)_____
Amount of Work Involved
Acknowledgement of Assistance

Presentation (15)_____
  Clarity of Description of Problem and Hypothesis
  Clarity of Description and Design and Procedures, Including Problems and How They Were Dealt With
  Clarity of Presentation of Data, Interpretations and Conclusions
  Overall Organization of Presentation
  Advantageous Use of Charts, Graphs, Drawings, Photographs, and other Audio Visual Aids
  Poise, Diction, Projection, Pace, Smoothness and Timing of Presentation and Appearance of Presenter
  Response to Questions

Abstract (5)_____
  Content
  Format, Grammar, Spelling, etc.

TOTAL (30)_____

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U.S. Army's 31st National Junior Science & Humanities Symposium

Research Finalists

ALABAMA REGIONAL

Nathan Cooper
"Sound Enhancement by Constructive Interference with Super Port"
Brewer High School
T: Mary Thomaskutty

Jimmy D'Andrea
"Cerebral Dominance Testing"
Auburn High School
T: Leigh Nix

Tony Kwon
"Four-Dimensional Geometry"
Auburn High School
T: Leigh Nix

Wade Tanev
"The Effects of Caffeine on the Regeneration of Dugesia dorotocephala"
Brewer High School
T: Mary Thomaskutty

Ben Venable
"Photovoltaic FOPOD of Aqueous Leachate Plumes"
Tallassee High School
T: Robert E. Hayes

ALASKA REGIONAL

Please see Page 19

ARKANSAS REGIONAL

Jennifer Baquail
"Modulation of Nitric Oxide Synthase May Account for the Anticonvulsant and Analgesic Activity of Cu(II) 2 (3,5-Diisopropylsalicylate) 4 [Cu(II) 2 (3,5-DIPS) 4]"
Little Rock Central High School
T: Jackie Dyer

Andrea Crutchfield
"Induced Guanine Adducts in Bacterial Plasmid"
Sheridan High School
T: Leesa Shankle

Jennifer Greer
The Electromagnetic Mass Launcher: A Third Year Study and Analysis of Design"
North Little Rock High School
T: Kathy Lister

Lisa Tanner
"The Formation of 4-Vinylguaicol as a Result of Yeast Contamination in Sealed Frozen Orange Juice"
Sheridan High School
T: Scott Ausbrooks/Leesa Shankle

Erin White
"The Effect of Diphenhydramine on E. coli Growth"
North Little Rock High School - West
T: Kathy Lister

Jon Zakrzewski
"The Design, Composition, and Analysis of Pascal's Pyramid, A Three-Dimensional Number Sequence Based Upon Pascal's Triangle"
North Little Rock High School - West
T: Kathy Lister

CHICAGO, ILLINOIS REGIONAL

Alan Dang
"The Chaos Game and Fractal Derivatives"
Lincoln Park High School
T: Mrs. Judith Ditkowsky

Ian McLeod
"Ceramic Engine-eering: A Study of the Effects of Zirconium Oxide on Internal Combustion Engines"
Oak Park and River Forest High School
T: Mr. Robert Gauger

Elizabeth Pine
"Clarifying Evolutionary Relationships Between and Among Two Major Groups of Basidiomycetous Fungi (Mushrooms and False-Truffles) by Means of rDNA Sequencing"
Illinois Math and Science Academy
T: Ronald H. Pine, Ph.D.

Robert M. Sargis
"Multidrug-Resistance in Ovarian Cancer"
Von Steuben M.S.C.
T: Henry Rosenbaum

Gretchen Purser
"The Stigma of Eating Disorders Impact on the Attitudes Towards Body Shape"
Lincoln Park High School
T: Mrs. Linda Abrams

Jill Morros Weinstein
"Antimicrobial Effect of Garlic Compounds"
Lincoln Park High School
T: Mrs. Pat Tosto

CONNECTICUT REGIONAL

Maria C. Choupres
"The Gender Bias in the Treatment of Post Myocardial Infarction Patients"
R.E. Fitch Senior High School
T: Dr. Richard P. Fazio

Kathleen Dalton
"Design and Evaluation of a 2-Dimensional Acoustic Position Measurement System"
Rockville High School
T:

Adrienne Proverb
"What is the Efficiency of Ink Removal in the Recycling of Various Papers?"
Danbury High School
T: Mr. Miller

James Rath
"Non-sinusoidal Electromagnetic Wave Forms"
Fairfield High School
T: Roger Fiondella

Karen Thickman
"Effects of Relative Humidity of Seed Storage on Boron Deficiency in Cucubrita pepo"
Glastonbury High School
T: Dr. Martin Cohen

DELAWARE REGIONAL

Joseph Allen
"A Study of the Similarities Between Sound Waves and Light Waves: Focus Upon Wave Interference"
Tower High School
T: Robert Waring

Catherine K. Huang
"Oxidation of 2-Chlorophenol by Sonochemical Process"
Tower High School
T: William Chase/Robert Waring

Eileen Lai
"The Absence of Color Modification by Reflection by a Mirror"
Tower High School
T: Robert Waring

Kenneth Jarrod Millman
"Deterministic Chaos and the Double Arm Pendulum"
Cape Henlopen High School
T: David Lybarger

Katherine Sharp
"The Effects of Different Alcohols on C_3 Plants: Solving the Problems of Photorespiratory Loss"
Cape Henlopen High School
T: Malcolm Judkins

Daniel P. Tyreus
"An Analysis of the Optimal Conditions for Launching a Projectile From a Mousetrap-powered Device"
Sanford School
T: Andre Dagenais

EUROPEAN REGIONAL

Christopher Scott Carpenter
"What Factors Influence the Ability of People to Correctly Identify Emotions Solely on the Basis of Non-Verbal Communication"
Lakenheath High School
T: Darryl Brock

Trevor C. Kearns
"Determining the Relationships Between Underwater Caustics and their Variables"
Ramstein Junior High School
T: Ms. Geraldine Potus

Robert David Koudelka
"Simple Molecular Constructions on Computers"
SHAPE American High School
T: Mr. Ross Calvert

Jostein Kristensen
"Magnetic Forces of Repulsion Between Circular Magnets"
Bahrain School
T: Mrs. J. Christenson

Jason Wening
"A Project in Dimensions"
Patch American High School
T: Mr. Leno, Mr. Bahn

FLORIDA REGIONAL

Jason I. Commander
"Shifts of Tonic Accommodation and the Accommodative Response Function"
Miami Palmetto High School
T: Mr. Jay C. Salon

Armando Hevia
"The Physical Chemistry Examination of Calcium Oxalate Crystal Nucleation on Brush Border Membrane Isolated from Rat Kidney"
William R. Boone High School
T: Mrs. Annette M. Cannon

Amy Elizabeth Herr
"Iced Airfoil Performance Degradation Due to Variation in Airflow Velocity"
Palm Bay High School
T: Mr. Joseph D. Pekich

Elaine P. Ho
"Isoprene Emissions from Angiosperm Foliage"
St. Petersburg High School
T: Mr. Randy C. McGonegal

Shelley E. Nixon
"The Effect of Growth Regulators on Different Caladium Cultivars"
Manatee High School
T: Ms. Patricia L. Zalo

GEORGIA REGIONAL

Charles R. Hankla
"Mathematics Attractors in Dendrochronology"
Henderson High School
T: H.J. Crumly

Esther Lim
"An Investigation of Cell Wall Structure of Methicillin-Resistant Staphylococcus aureus (MRSA)"
Henderson High School
T: Hal Crumly

George Lui
"Fractal Growth Phenomena: A Consequence of Fluid Dynamics on Porous Media"
Riverwood High School
T: Mrs. Elsner

Sumayah Taliaferro
"Bioremediation of Toxic Heavy Metals Using a Mixed Microbial System"
Benjamin E. Mays High School
T: Mrs. Lillie King

Matthew B. Trevathan
"The Use of Magnetohydrodynamic Thrust in Varient Thrust Media"
Glynn Academy
T: Mitzi Youngblood

GREATER WASHINGTON, D.C., REGIONAL

Faith Cinquegrana
"MSA Catalyzed Esterification: A Two-Year Study"
Langley High School
T: David Buchanan

Joshua David Goldberg
"Planaria and Radiation: A Two Year Study"
Woodrow Wilson Senior High School
T: Carole Daniel

Joanna Pleeter
"The Prevalence of Seasonal Affective Disorder in Children and Adolescents"
Walt Whitman High School
T: Georgetown University/Dr. Douglas Eagles

Terrell Stoessell
"In Vitro Mutagenesis of c-raf-1; a Gene Associated with Radiation Resistance of Tumors"
Thomas Jefferson High School of Science & Technology
T: Dr. Ester H. Chang

Laura Wilbur
"Solid Modeling of a Double Hull Ship"
Thomas Jefferson High School for Science and Technology
T: J. Matthew Grassman, David Taylor Research Center

ILLINOIS REGIONAL

Jason Alan Syrcle
"Diversity of Life in a Pine Cone"
Barry High School
T: Mrs. Melinda Fagan

Jeffrey A. Theis
"The Effects of Various Chemicals on the Heart Rate of Daphnia magna Phase III: Alkaloids"
Rochester High School
T: Mr. Lyndell Robinson

INDIANA REGIONAL

Jonathan R. Dillman
"Effects of Presoaking and Hypothermia on the Emergence Time and Germination Rate of Medicago sativia"
Paoli Jr-Sr High School
T: William Tom Anderson, Jr.

Jennifer Lehman
"The Effects of Specific Decomposers on the Biodegradation of Waste Motor Oils"
East Noble High School
T: Harold Sollenberger

Neva Pilar Meyer
"Effects of Prolactin and Interleukin-2 on Stathmin Synthesis and Phosphorylation in Human Peripheral Blood Lymphocytes and the Nb2 Lymphoma"
Paoli Jr-Sr High School
T: William Tom Anderson, Jr.

Alexis L. Michael
"Development of a Large-Area CsI (T1) Detector for Nuclear Physics Experiments"
The Indiana Academy for Science, Mathematics and Humanities
T: Jeff Smith

Carrie Tomasallo
"Environmental Electromagnetic Radiation from Video Display Terminals: Phase III - Examining Genetic and Morphological Alterations in Rana pipens Haploid Embryonic Tissue and Saccharomyces cerevisiae"
Paoli Jr-Sr High School
T: William Tom Anderson, Jr.

INTERMOUNTAIN REGIONAL

Sarah Lord
"Congruential Relationships of Divisor Functions"
Big Sky High School
T: James Harkins

Michael R. Shirts
"Effects of Static Compression on the Kinetics of Proteoglycan Fragment Diffusion in Cartilage Explants"
Timpview High School
T: Vern Bangerter

Kama White
"Epidermal Growth Factor Receptor Sites in the Uterus of the Western Spotted Skunk During Delayed Implantation and Implantation"
Moscow High School
T: Connie Hall

Jay Yahne
"Analysis of Soil's Tendency to Liquefy When Struck by Longitudinal Seismic Waves of Varying Magnitudes of Force"
Clearfield High School
T: Mr. Ronald Yahne

John Jose Yates
"A Regional Comparison of PrP^C and PrP^{Sc} in Various Tissues of Normal, Transgenic, and Scrapie-infected Mice"
Browning High School
T: Mr. Creighton D. Steiner

IOWA REGIONAL

Andrea B. Clark
"Bug Off! Creatures of the Corn. A Plot Study of Ostrinia nubilalis on Zea Mays"
Algona Community High School
T: Walter Reemtsma

Lily Y. Kim
"Observing Particle Removal by Changing the Dosing Time in LAPR"
Bettendorf High School
T: Peter Bruecken

JoAnne Peleck
"Effects of Agricultural Herbicides on Lumbricus terrestris"
Marshalltown High School
T: Beverly Iverson

Nicole Rascon
"Analysis of Aflatoxin Levels in Various Brands of Commercially Available Peanut Butter"
North High School
T: Henry Becker

Karin Wilhelm
"Carbon Filtration: A Solution for Removing Trihalomethanes from Drinking Water"
Stuart-Menlo High School
T: Larry Schwinger

KANSAS-NEBRASKA-OKLAHOMA REGIONAL

Abigail D. Hankin
"The Effect of a Magnetic Field on a Circadian Rhythm of the Eye"
Shawnee Mission South High School
T: Dr. Gene Hampton

Hillary Hartley
"Cataclysmic Variable Stars: Stars that go Bump in the Night"
Baxter Springs High School
T: Ms. Renee Trewyn

Ravi Shanker Kamath
"Characterization and Analysis of a Ricin B-Chain Galactose Binding Mutant Through a Bacteriophage Display System"
Shawnee Mission East High School
T: Dr. Philip Childress

Kevin Main
"Environmental Effects on the Morphogenesis of Ciliate Protozoan - Phase II (Oxygenation of the Water System by Physical and Chemical Means)"
Moore High School
T: Ms. Teresa Jacobs

Martin Stiaszny
"The Mutagenic Effects of Ultraviolet Radiation"
Shawnee Mission South High School
T: Dr. Gene Hampton

KENTUCKY REGIONAL

Amy Crout
"Physical Properties of Polyacrylamide and Agarose Gels"
Notre Dame Academy
T: Sr. Mary Ethel Parrott/Sr. Mary Judith Averbeck

Matthew Graul
"The Use of Potassium chloride to Control the Zebra Mussel and the Possible Effects on the Aquatic Ecosystem"
Henderson County High School
T: Susan Mueller

Christie Hatton
"Scopolamine-Induced Deficits in Spatial Navigation: A Model for Spatial Disorientation in Alzheimer's Disease"
Nicholas County High School
T: Kathy Green

Erin Sudbrack
"The Leaching of Copper from Chalcopyrite by Two Thiobacilli"
Notre Dame Academy
T: Sr. Mary Ethel Parrott

Jennifer Elaine Wade
"Seepage versus Wave Action: An Ohio River Erosion Study Phase Three"
DuPont Manual High School
T: Barbara Fendley

LOUISIANA REGIONAL

Cathy Marie Chavez
"Acquired Immunodeficiency Syndrome"
Cuillier Career Center/John Ehret H.S.
T: Ms. Laura Gillen

Puneeth Iyengar
"Applications of the UMU Assay in Measuring the Effects of Rat and Mussel edulis L. Enzymatic Proteins on Direct-Acting Mutagenicity"
Baton Rouge Magnet High School
T: Mrs. Mary Hamilton

Pichakron O. Kullada
"Immunostaining Techniques in the Detection of Wild-Type and Mutant p53 Protein"
Louisiana School for Math, Science and the Arts
T: Dr. Yuan-Shing Kao, MD and Dr. Carol Sanders, PhD

Ryan Viator
"An Analysis of Cultivation and Herbicide Interaction on the Environmental, Agricultural, and Economic Concerns of Sugarcane"
Catholic High School
T: Dr. Donald J. Voorhies

Katy Wall
"East Island: The Sands, the Vegetation, and Overall Environment"
Baton Rouge Magnet High School
T: Dr. Denise Reed

MARYLAND REGIONAL

Lina Chen
"Site Directed Mutagenesis and Expression of a Chimeric Class I Major Histocompatibility Compley (MHC) Gene"
Walt Whitman High School
T: Michael McKinstry

Steve Shaw-Tang Chien
"A Multi-Dimensional Extension of Wythoff's Game"
Montgomery Blair High School
T: Ms. Nanette Dyas/Ms. Mary Ellen Verona

Melody Ann Finch
"Testing and Calibrations of Ultraviolet Spaceflight Instrumentation"
Gwynn Park High School
T: Rosie Pointer/Joy Claud

Su-Ping Lu
"An Investigation of the Insulin Receptor Gene of a Patient Exhibiting Leprechaunism"
Montgomery Blair High School
T: Mrs. Doris Sandoval

Mona D. Shah
"Monoclonal Antibody - Antigen Interaction Mechanism"
Montgomery Blair High School
T: Mrs. Doris Sandoval

METROPOLITAN NEW YORK REGIONAL

Ellen Joy Hoffman
"The Effect of Cyproheptadine on the Luminescence of Larval Firefly Lanterns Due to it Inhibition of Octopamine Receptors"
Half Hollow Hills High School East
T: Raymond McGraine

David Katz
"A Phototactic System Proposal in Euglena gracilis"
Ward Melville High School
T: Mrs. Melanie Krieger

Davida Rapoport
"The Role of Macrophages in the Central Nervous System of Rats with Experimental Autoimmune Encephalomyelitis-Three Year Study"
Hebrew Academy of the Five Towns and Rockaway
T: Dr. Nierman

Edmund H. Wong
"Regulation of Apolipoprotein E Gene Expression in Macrophage Cell Lines"
Stuyvesant High School
T: Mr. Richard M. Plass

MISSISSIPPI REGIONAL

Jacob Joseph Eftink
"The Chemistry of Popping Popcorn"
Oxford High School
T: Martha Whitwell & Carol Alderman

Susan D. Fieselman
"A Comparison Between Biodegradable and Nonbiodegradable Styrofoam as Soil Additives"
St. Andrew's Episcopal School
T: Dan Rose

Jeffrey Howell
"Influence of Soil Fumigation and Fungal Infestation on Rygrass Growth and Development"
Rebul Academy
T: Beth Guider

Christopher Murriel
"The Effects of para-Aminobenzonic Acid on the Survival Rate of a rec A Mutant Strain of Escherichia coli K-12 Exposed to Ultraviolet Radiation"
Clinton High School
T: Dr. James B. Hutchins/Ms. Rita Anderson

Nan Nazaretian
"A Six-Year Study: Do Orange Oil and Reticulitermes flavipes (Isoptera: Rhinotermitidae) Mix?"
Long Beach High School
T: Mrs. Kathy Roberts/Mrs. Christine Kayes

MISSOURI REGIONAL

Sara Nicole Drebes
"The Effects of Probiotics and Antibiotics Upon Rate of Gain and Feed Efficiency in Swine"
Monroe City R-1 High School
T: Michelle Kendrick

Eric Edward Johnson
"An Investigation of the Effects of Ultrasound on Calcium Carbonate"
Central High School
T: Dr. Charles W. McLauglin/Dennis Reule

Amy Lawson
"Analysis of Antibiotic Resistance in Bacteria of Bovine Origin"
Joplin High School
T: Michael Lawson

Leland Craig Piveral
"The Effects of Silane on the Adherence of Asphalt to Gravel"
Central High School
T: Mr. Dennis Ruele

Susan Renee Pope
"A Three Year Study of the Behavior and Development of the Mymeleon formicarius (Antion)"
Eldon High School
T: Constance Wyrick

Jennifer Rumsey
"Accuracy in Fish Age Determination"
Liberty High School
T: Gary McCollough

MONMOUTH REGIONAL

Stefanie Kersh
"The Correlation Between the Quality and Quantity of Police Intervention and the Type of Domestic Violence Offense"
Medical Science Learning Center - Freehold High School
T: Linda Balzer

Barbara MacNeill
"Comparison of Two Lakes Investigating Possible Pollutants from a Paint Company"
Highland Regional High School
T: Dr. Marcia Leek/Eric Zimmerman

Alex Vuong
"Effect of Radiation on the Fertility of Drosophila Melanogaster When Applied at Various Stages of the Life Cycle"
Pennsauken High School
T: Robert Nicholson

Jeffrey Lloyd Wasserman
"Memory Retention of Subliminally Flashed Vocabulary Words on a Computer"
Medical Science Learning Center - Freehold High School
T: Jack Davalue

Scott E. Wolkenberg
"The Extent of the Enzymatic Breakdown of Porcine Somatotropin as Shown by Agarose Gel Electrophoresis"
Oceanside Township High School
T: Vickie Bejda

NORTHERN CALIFORNIA-WESTERN NEVADA REGIONAL

Laila H. Abedelal
"The Use of Nitrogen and Phosphorous as Enhancers of Microbial Oil Biodegradation"
Clovis High School
T: Conrad Bitters

Jeffrey Kopicko
"Frequency of Medical Emergencies for Reno, Nevada-1992"
McQueen High School
T: Yvonne Geary/Ardynne Sprinkle

George C. Lee
"Bioremediation: Microbial Degradation of Hydrocarbons on the California Coast and Its Effects on Marine Ecosystems"
Mission San Jose High School
T: Neil Evans

Shruti Haren Parekh
"The Effects of Temperature on the Anatomy of the Meristem and Branched Root Initiation Sites of Pea Plants"
Mission San Jose High School
T: Neil Evans

Ethan C. Smith
"Growth of Candida utilis in Kraft Black Liquor"
Eureka Senior High
T: Bill Schaser

NORTH CAROLINA REGIONAL

Sharon A. Chung
"The Effects of Acidity and a Protein Synthesis Inhibitor on the Killing Activity of Saccharomyces cerevisiae"
N.C. School of Science and Mathematics
T: Emily Maxwell

Anthony Ku
"Optimization of the CVD-Chamber Synthesis of Fullerness Using Organic Vapors: A Two-Year Study"
N.C. School of Science and Mathematics
T: Dr. Myra Halpin

Kevin Matson
"The Effects of Simulated Solarization on Selected Meloidogyne Species"
N.C. School of Science and Mathematics
T: Emily Maxwell/Dr. Kenneth Barker

Michael Poon
"Complementation of Mutator T in Escheria Coli with a Possible MutT Gene from Yeast Cells"
William G. Enloe High School
T: Zannie Efird

Heather Summerell
"Habitat Preferences of Micropterus Salmoides"
William G. Enloe High School
T: Brian Wood/Elise Irwin

NORTH CENTRAL REGIONAL

Ryan David Egeland
"Survival and Levels of Protein, Carbohydrate, and ATP in Daphnia Magna during Chronic Exposure to NaCl Pollution"
Wayzata Senior High School
T: Debora Brooks-Golden

Mark A. Johnson
"Quantitative Analysis to Simulate Water Fluctuations of Small Lakes"
Aitkin Public High School
T: William Muscatello

Sara J. Purvis
"The Role of Agitation in the Formation of Sex Pili in Conjugating Bacteria"
Lake Crystal-Wellcome Memorial H.S.
T: Nancy Zwickey

Steve Sherman
"PHASE IV: The Effects of Riblets on Efficiency of Aircraft Wings"
Winona Senior High School
T: Jerry Foster

Quinn Stein
"The Effects of Oral and Injectable Iron on Hematocrit Readings and the Growth Rate of Pigs"
Hankinson High School
T: Mr. Marcus Friskop

NORTHERN NEW ENGLAND REGIONAL

Somak Chattopadhyay
"Genetic Mutations Produced by Ionizing Radiation"
South Burlington High School
T: Mrs. Roberta Baker

Alan Fern
"A Computer Simulation of Intelligent Processes through the Use of Perceptrons and Neural Networks"
Dexter Regional High School
T: Al Lee

Tara Lea Hayes
"How Does Storage Affect the Ascorbic Acid in Tomatoes and Oranges?"
Penquis Valley High School
T: Virgil Valente

Suzee Eurie Lee
"Fractal Dimensional Analysis of Non-Flagellated Bacterial Colonies"
Phillips Exeter Academy
T: Richard Aaronian

Ben Polito
"Performance of Very Small Wooden Hulls"
Morse High School
T: Simone Utley

NORTHERN JERSEY REGIONAL

Andres Alvarado
"Landfill Wildlife Habitat Study"
Union Hills High School
T: Nadia Makar

Ana Baptista
"How to Decrease Smoke Pollution from Wood Burning Fireplaces"
Science High School
T: Mel Robin

Megan M. Bell
"The Relationship Between Gustation, Olfaction and Vision in Flavor Determination, and Extent of Influence Age & Sex Have On It"
Immaculata High School
T: Sister Mary Ann Besitka

Laura Caprario
"Regulation of The Acyl-CoA Synthetase Gene mRNA by Insulin and Tumor Necrosis Factor Alpha: Studies of Signal Dominance"
Monclair Kimberley Academy
T: Betty Rose Schwier

Wendy Ellen Katstra
"Alterations of the 1-2-3 Superconductor Show Promise"
Warren Hills Regional High School
T: Allan B. Hodge

OHIO REGIONAL

Jonobie Dale Baker
"Designing and Implementing a 4-D Graphics Language"
Theodore Roosevelt High School
T: Mr. Jon Secaur

Rakhi Chaudhuri
"Gap Junctional Communication in Mice Lung Cells: Effects of Transformation and Tumor Promoters"
Maumee Valley Country Day School
T: Randall Ruch: Medical College of OH

Amy L. Creekmore
"Analysis of the Retinoblastoma Gene and Protein in Cancer Tumors and Sections"
Calvin M. Woodward High School
T: Dr. Ming You/Dr. Keith Crist

Jacqueline Ann Shuster
"Ground Based Simulation of Micrometeroid Induced Acoustic Events"
Perry High School
T: Tracey Evans

Daniel Cramer Stevenson
"Electrochemical Deposition Simulated by Generalized Diffusion-Limited Aggregation"
Hudson High School
T: Mr. Vaughn D. Leigh

OREGON REGIONAL

Janelle Curtis
"Giant Boulders of the Missoula Floods"
McNary High School
T: Bea Epperson

Janet Halter
"Inhibition of the Pathogen, Listeria Monocytogenes, by Nisin in a Salty Environment"
McNary High School
T: Bea Epperson

April Parsons
"The Effects of Acid Rain on Amphibians"
Harrisburg Union High School
T: Ms. O'Malley

Amy J. Thompson
"An Environmental Study of Cascade Gateway Park, A Recreational Area in Salem, Oregon"
McNary High School
T: Bea Epperson

Leanne M. West
"Anthocyanin Glucoside Content in a Pinot Gris Grape Mutant"
McNary High School
T: Bea Epperson

PACIFIC REGIONAL

Sara Craigmiles
"Comparison of Ambient Air Quality on the Miura Peninsula, Japan"
Nile C. Kinnick High School
T: LCDR William Lutrell

Alisa Duncan
"Comparison of Ambient Air Quality on the Miura Peninsula, Japan"
Nile C. Kinnick High School
T: LCDR William Lutrell

Burt T. Hensley
"How Strong are Spider Webs?"
Taegu American School
T: Dorinda L. Nagy

Annie Lee
The Prediction of the Buffering Capacity of a Malathion Contaminated Soil Through the Physical and Chemical Characterization of Five Uncontaminated Soils"
Seoul American High School
T: Samia Mounts/Major Rick Hoff

Cynthia A. Wares
"How Strong are Spider Webs?"
Taegu American School
T: Dorinda L. Nagy

PENNSYLVANIA REGIONAL

Bridget Anne O'Leary
"A Comparison of the Effectiveness of Various Antibiotics in a Multigenerational Study of Streptococcus viridans"
Villa Maria Academy
T: Mrs. Marlene Trambley

Benjamin Tu Peng-Chu
"The Mechanism of Antibiotic Action of 1-chloro-2,4-dinitrobenzene (CDNB)"
State College Area High School
T: Julie Gittings, David Klindienst

David A. Schlosser
"A Comparison of in-vitro and in-vivo Toxicity Levels"
Abington Heights High School
T: Mr. Donald H. Kieffer

Shoban A. Dave
"Cryogenic Pyroelectricity"
Upper St. Clair High School
T: Mrs. Jean Austin

Rex Wang
"Ribosomal RNA Processing in the ciliate Tetrahymena thermophila"
Allentown Central Catholic High School
T: Mr. Mark Damiter

PUERTO RICO REGIONAL

Ednaly Ortiz Camacho
"Chemical and Geological Analysis to Identify Precolumbian Ceramic Source and the Impact on Soil Strata Phase IV - A Four Year Study"
Jose S. Alegria High School
T: Dr. Agamenon Gus Pantel/Arq. Hernan Ortiz

Danaise V. Carrion
"Postharmos tomum: Novel Life Histories and New Distributional Data"
Colegio Bautista de Carolina
T: Dr. Freddy A. Medina/Vicente Huertas

Erica Maldonado
"Assessing the Presence of Biphenyl and PCB Degrading Organisms in Tropical Soils"
Colegio De La Salle
T: Dr. Gary A Toranzos/Iraida E. Robledo/Maritza R. de Vega

Freddy A. Medina
"Biological Activity of Bidens pilosa on Fasciola hepatica Larval Stages"
Carvin School
T: Dr. Freddy R. Medina

Liza D. Robles
"Phytochemical Analysis of the Insecticidal Properties of Phytochemical Analysis of the Insecticidal Properties of Hymenaea cuorbaril Leaf"
University Gardens High School
T: Dr. Pedro I. Chavez/Mrs. Maria E. Andino

SOUTH CAROLINA REGIONAL

Joseph Keith Gardner, Jr.
"Raman and Infrared Spectra, Conformational Stability, Vibrational Assignment, and ab Initio Calculations of Chloromethyl Isocyanate"
Governor's School for Science & Mathematics
T: Dr. Joseph Mitchener/Dr. Scott Little

Brian Harmon
"BUCKMINSTERFULLERENES: The *Synthesis of* C_{60} *Molecules and Evaluation of their Lubricity"*
Lexington High School
T: Linda D. Sinclair

Nicole A. Janasik
"Do All Aspects of Fish Secrete a Growth-inhibiting Substance and thus Will Only Grow to the Size of the Tank They Inhabit?"
Hilton Head High School
T:

Andrew Rhine
"On the Possibility of a Quantum Transistor"
Lexington High School
T: Linda Sinclair

Katya A. Strinka
"Measurement of Contact Angles Between a Polymer and Fibers"
S.C. Governor's School for Science & Mathematics
T: Taha Mzoughi

SOUTHEASTERN MICHIGAN REGIONAL

Erik J. Edoff
"Toxic and Morphological Effects of Asbestos Fibers in the Environments of Macrophages, Microorganisms, and Regenerative Cells Cultured In Vitro Phase III: Alternative of Magnesium Ionization"
Athens High School
T: James D. Edoff, Ph.D

Karen Jacobson
"The Protective Effects of Selenium and Mercury in Japanese Medaka Embryos: A Two-Year Study"
Detroit Country Day School
T: Arlene Rama

Prashant Mishra
"Numbers and the Sum of their Divisors"
Detroit Country Day School
T: Gene Menton

Seema Mukerjee
"The Impact of Environmental Temperature Variation on the Biodegradation of Halogenated Aromatic Compounds by Aerobic Composting Microorganisms"
Detroit Country Day School
T: James D. Edoff, Ph.D

Asheesh Tewari
"In Situ Dephosphorylation of p53 Protein by Calf Alkaline Phosphatase Treatment: A Two Year Study"
Cass Technical High School
T: Haigouhe H. Benson

SOUTHEASTERN PENNSYLVANIA REGIONAL

Eric Logan
"The Effects of Sleep Deprivation on Human Behavior Phases I-IV"
Cheltenham High School
T: Dr. John Bermel

Christine L. Muir
"The Influence of Glove Donning Powders on Adhesion and Granuloma Formation"
Holy Name High School
T: Mrs. Deborah Hanahoe

Andrew Shieh
"Chemotaxis of Nitrogen Fixing Bacteria to Flavones"
Upper Dublin High School
T: David Waltman

Stanley Wei
"Optimization of Lipase Harvests"
Upper Dublin High School
T: David Waltman

Theresa Marie Weller
"Computerized Small Animal Feeder"
Reading Central Catholic High School
T: Mrs. Nancy O'Leary

SOUTHERN CALIFORNIA REGIONAL

Constance Chen
"Maturation, Tumorigenicity, & the Expression of the Novel Genes LOV and PEM"
La Jolla High School
T: Dr. Carol MacLeod

Julie Gutmark
"Eye Dynamics as a Diagnostic Tool for Visual Disorders"
Sherman E. Burroughs High School
T: Dr. Victor Holmes

Phuc Thi Ngoc Le
"Insecticide- and Herbicide-induced Alterations in Retroviral Transforming Expression"
Chula Vista High School
T: Dr. Neal Biggart, San Diego State University

SOUTHERN NEW ENGLAND REGIONAL

Sirshendu Roopom Banerjee
"Polymerase Chain Reaction (Phase II): Today's Technology for Tomorrow's Applications"
Lexington High School
T: Dr. Stephen Friend, Harvard Univ./Mass General Hospital

Tara R. Bennett
"Microbial Alteration of Malathion Toxicity"
North Attleboro High School
T: David Vito

Kathryn R. Flanagan
"The Effect of Caffeine on Osmoregulation in Uca"
Joseph Case High School
T: Mr. Michael Lewandowski

Raymond W. Li
"Method for the Commercial Production of Helminths Antigens"
Boston Latin School
T:

Eric P. Richard
"Screening for Restriction Enzymes: Part Two"
Beverly High School
T:

SOUTHWEST REGIONAL

Laura Elisabeth Becvar
"Lumitox: Environmental and Medical Applications"
Coronado High School
T: Mr. Geary Don Crofford

Josephine A. Esparza
"How Effective is Sewage Processing"
Cuba High School
T: Lorenzo Gonzales

Christina Isabel Gutierrez
"Harry the Bar Fly (FWI) Flying While Intoxicated"
Grants High School
T: Shelby Alexander

Brent Herrera
'To Determine the Affects of Music on Drawing"
Cuba High School
T: Lorenzo Gonzales

Gregory A. McDonald
"Producing Hydrogen Fuel from Solar Energy"
Buena High School
T: Barbara Swasey and Diane Lemley

Jahnavi Srinivasan
"Chromatography of Pre-Batch Luciferase vs. Chromatography of Post-Batch Luciferase"
El Paso High School
T: Judith Ochoa

TENNESSEE REGIONAL

Kristie Jenkins
"The Fates of Ball and Elliptical Galls on Solidago Candensis and Their Importance as Secondary Microhabitats"
Clinton High School
T: John Byrd

Touchere Johnson
"Effect of Epidermal Growth Factor on Trypanosoma Cruzi Intracellular Multiplication"
Hillsboro High School
T: Dr. Eva M. Wike

Laura Partin
"Extraction of Hydrocarbons From Soil With High Pressure Liquid Carbon Dioxide"
Hillsboro High School
T: Dr. Eva M. Wike

Foy White
"Population Ecology of Peromyscus Leucopus, Microtus Pinetorum, Blarina Brevicauda, Peromyscus Nuttalli, and Rattus Norvegicus in an Abandoned Landfill"
Oak Ridge High School
T: Fred Holtzclaw

TEXAS REGIONAL

Doris R. Brown
"Interaction of an Oncogene and Tumor Suppressor Gene Product: Role in Oncogenesis"
Northside Health Careers High School
T: Ms. Thyajaragan

Raul I. Cuadra
"A Third Year Study of Pure Titanium Properties for Implant and Restorative Dentistry"
Louis W. Fox Academic & Technical High School
T: Mrs. Rose A. Perez

Kurt Alan Franke
"Acoustic Holography: Reconstruction of Amplitude Holograms"
John Marshall High School
T: Roy Baldwin

Siri Sastri
"A Link Between Nicotine in Cigarettes and Atherosclerosis: A Two-year Study"
A & M Consolidated High School
T: Mrs. Kristen Henry

Debbie Yeh
"The Effects of Isoproterenol on Treating Anaphylaxis with Previous Beta-Blocker Administration in Xenopus laevis Tadpoles"
Shepton High School
T: Mrs. M. Poovey

UPSTATE NEW YORK REGIONAL

Amy Lu
"The Effects of Electromagnetic Fields on Chlamydomonas: A Link to Human Cancer"
Newburgh Free Academy
T: Annette Saturnelli

Robert A. Meguid
"Surfeit Caloric Intake During Parenteral Nutrition Accounts for Delay in Food Intake Normalization"
Fayetteville-Manlius High School
T: Mr. Martin D. Alderman

Leocadia V. Paliulis
"Experimental Analysis of Secretion in the Green Alga Colsterium"
Schuylerville Central School
T: Rosemary Cenci

Robert Sudakow
"Toxicological Effects of Enalapril, Alcohol, & Nicotine in Fetal Chicken Embryos & A Comparative Analysis with Human Fetal Birth Defects"
Utica Senior Academy
T: Mr. Don Henderson

Ying Taur
"The Effects of RecA Function on Loss of Plasmids Due to Incompatibility"
Bryam Hills High School
T: Dr. Robert Pavlica, Ph.D.

Shinjiro Watanabe
"Dynamical System Models of Queues"
Bryam Hills High School
T: Dr. Robert Pavlica, Ph.D.

VIRGINIA REGIONAL

Joseph Paul Salyards II
"Bioremediation of Landfill Leachate"
Valley Baptist
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